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EDITORIAL COMMENT

This month we have a new program available written by Richard VanHouten, which is a Small C programing support library. Not being programmers ourselves and knowing just enough about Basic to be dangerous, we will leave the description of these two programs up to the experts, Richard VanHouten and David Goben. Recently there have been some comments made by people who should know better that a new version of Small C was unnecessary because it had been around for ten years or more. That too, we will leave up to the experts to explain. But knowing that all the programs we have published since the dropping of TRS-80 support by Tandy Radio Shack have been of superior quality to that which existed before, we supported these efforts. If they were not superior in quality and ease of use, then why bother. "Why re-invent the wheel". Because there certainly is very little profit in spending great amounts of time on developing new programs for the Model III and IVs, one might ask "Why do we do it?" We do it because six years ago when all the real support for the TRS-80 average user (excluding the hacker, extremist) was dropped, we promised to support the TRS-80 user as long as they wanted and needed us. That promise is what we are committed to keeping.

Many of the projects that we have supported the development of, both in the software and the hardware area, have been justified only by a 'break-even' number of sales and yet the product was needed by the TRS-80 user so we did it. And there are currently several other projects that we are supporting that are close to being announced. Just to mention one or two, that might prove our point and wet your appetite, are an IDE hard drive interface for the model 4, and possibly an interface to connect an external CD ROM drive to the model 4. And CLIPART on a disk for MagicDraw is in the works and will soon be available.

If you love the simplicity, and the pure fun of using a TRS-80 computer as much as we do then we are sure of your support. And we appreciate your support even more, because without it none of these projects could have ever been accomplished.

One other comment (and the last time we hope to ever have to bring the subject up) is that we have never had the attitude to malign any other supplier of TRS-80 products or support, or to have the attitude that we should try to force them out of business. All the comments that have been flying around to that effect are pure poppycock. The market place will always have room for those who choose to provide service to any group of consumers. It depends on the business to provide quality service and attract customers. We have always held the philosophy (for almost fifty years now) that there should be more than one source of supply for any consumer and let the cream float to the top. The consumer will always abandon any supplier of a product or service that no longer fills his needs. That is just a classic marketing premise, and the root of human nature.
-Ed.

New Products

Announcing VanHouten's function library for Small C: VH/LIB

Features: Wildcard directory searching, low and high resolution graphics routines (with emphasis on the high resolution routines), and mouse interface routines.

Now available from CN80 for only $19.95 + $4 S&H.

VH/LIB

RICHARD VANHOUTEN'S SMALL C LIBRARY

by Richard VanHouten

Well, it took a bit longer than first estimated, but I finished up my function library for Small C. In the flush of converting previously written routines for MC over to Small C, I forgot how long debugging all-new routines would be... Here's the low-down on what's in there.

Mouse interface routines:
checkmouse() to see if a mouse driver is installed. Very important, since DOS 6 crashes back to DOS Ready on an SVC error.
mousetype() to determine if the driver is set up for a 2 or 3 button mouse.
setmouse() and getmouse() set and get the mouse position, with getmouse also returning the mouse button status.
setsense() and getsense() set and get the mouse driver X and Y limits, and sensitivity.

Text screen video control routines:
cls() clears the text screen.
cursor() positions the text cursor to a specific screen location.
curpos() returns the current cursor position.
curshape() changes the current cursor character.

Wildcard directory search routines:
getfirst() finds the first file that matches a wildcard spec, and getnext() continues the search set up by the last call to getfirst().

Time and date routines:
systime() and sysdate() pack the current time or date into a buffer in the formats HH:MM:SS and MM/DD/YY respectively.

Character manipulation:
toupper() and tolower(). These do the same things as the toupper() and tolower() in the standard library, but have been recoded in assembly language to save space (saw them being linked in as 45 bytes each, and thought that excessive for these simple routines).

String manipulation:
strupr() and strlwr() convert a whole string to upper or lower case.

Low resolution graphics routines:o
lset(), lreset(), ltoggle(), and lpoint() set, reset, flip, and return the value of one graphics block on the low-resolution (text) screen.

High resolution graphics routines:
grafinit() initializes the graphics module, and tests for presence and type of high-resolution board installed.
hmode() chooses the screen mode: text, high-resolution graphics, or both (mixed together). You can also specify no-waits for high-speed (but snowy) displays on the Tandy high-res board (has no effect on the Grafyx Solution from MicroLabs.)
hview() sets up a viewport that limits the effects of nearly all other routines.
hcls() clears the graphics screen to all-black or all-white (or whatever your phosphor color is)
hset(), hreset(), htoggle() and hpoint() set, reset, flip and test individual high-res points.
hhline() and hvline() draw horizontal and vertical lines, respectively.
hline() draws lines between arbitrary points.
hbox() and hboxf() draw open and filled rectangles, respectively.
hcircle() draws an open circle.
hpaint() fills in a closed area.
hget() and hput() save a rectangular region in a buffer, and draw a pattern stored in a buffer on the screen, respectively.
hsave() and hload() save a screen in a file, and load a screen from a file, respectively. /HR, /CHR, and /SHR formats supported, and these routines do not respect the viewport limits.

Input/output routines
fprintf(), printf(), sprintf() print formatted output to a file, stdout, and a string, respectively. fprintf() and printf() are basically unchanged from the standard Small C library, the only changes being those internal ones needed to integrate sprintf().
fscanf(), scanf(), sscanf() get formatted input from a file, stdin, and a string, respectively. Again, fscanf() and scanf() were included to integrate sscanf().

Miscellaneous routines:
srand(), rand() and rnd() seed the random number generator, return a number from 0 to 65535, and return a number between 0 and an arbitrary positive integer, respectively.
setjmp() and longjmp() set up for and perform an inter-function jump.
system() calls a DOS library function.
abort() and exit() perform like the abort() and exit functions in the standard library, except they return the screen mode to text.

I wrote all the routines in assembly, except for the printf() and scanf() families, which I left in primarily in C (some internal functions needed by sprintf() and sscanf() were written in assembly due to limitations of the Small C compiler.)

If you're interested my doing further development of this library, or you would be interested in buying an MC version of the library, let me know.

DEZIP 3.0
As some of you are aware, I've written a number of shareware archive extraction utilities over the past few years. This spring, I released the latest incarnation of DEZIP, which handles archives created by PKZIP version 2.04. I have also written DEARC, which handles archives created by ARC (version 6 and previous), PKARC/PKPAK, and PAK under MSDOS, and ARC31 and ARC4 on the TRS-80s; DELZH, which handles archives created by LHARC/LHA under MSDOS and LZHUF4 on the model 4 (written by Kevin Cribbs); and DEARJ, which handles archives created by ARJ under MSDOS. These are available for try-out on TRS-80 oriented BBS's and in the File Cabinet, and most have been published in TRSLink. To register any of them, and get the current version, send $10 for each one you are registering to me at:

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Archiving is a method of storing infrequently-used files in a more compact form. There are two general ways of doing this: storing multiple files together, to reduce space that would be wasted at the end of each, and compressing a file to reduce the redundancy within it. The library SYS files of LDOS 5 (SYS6/SYS and SYS7/SYS) and DOS 6 (SYS6/SYS, SYS7/SYS and SYS8/SYS) are examples of the former method, and /CHR files are examples of the latter. Archive utilities such as ARC and

PKZIP use both methods, combining multiple files into one archive, and compressing component files when possible.

There are just a few basic types of compression in general use for file compression (there are a few more that can be used for image and sound compression, where some loss of information is tolerable). The simplest is Run Length Encoding (RLE), where repeated bytes are encoded by a simple short sequence giving the byte to repeat and the number of copies of it. This is used in /CHR file storage, and also on the TRS80 in the form of the space compression codes (character codes 192-255) when the special character set is disabled.

Another is Huffman coding, where a weighted binary tree is used to determine how many bits to use to encode each byte, with frequently used bytes (such as <SPACE> or "e" in English text) being represented by fewer bits, and infrequently used bytes (such as "Q" in English text) being represented by more bits.

In 1977 and 1978 Ziv and Lempel published 2 articles laying the foundation for dictionary-based data compression. These articles, and the compression methods based on them, are usually referred to as LZ77 and LZ78 respectively. LZ78 was the first of these to be widely used, in its LZW variant. In LZ78, the dictionary is made by encoding each new character being added to the preceding output code to form a new a new code, which may be output the next time that that combination of characters is found. Newer modems with V.42bis data compression use this method.

LZ77 is the current compression champion among lossless compression methods. In this method, the compressor input stream up to a certain point (the "window length") is used as the dictionary to find matching strings. If a previous matching string is found, the offset and string length are output.
-Richard VanHouten

A MINI HARD DISK

by Robert D. Gore

I wanted more disk storage space. I had to decide whether I wanted to purchase a 5-MEG hard disk or a double 3.5-Inch external floppy system. The floppy system would give me about 1.4 MEG of storage. I could get either one for about the same money. Well after some thought and consideration I decided on the floppy system. I did this based on a couple of reasons; one: I feel more comfortable with the reliability of the floppy drives. two: I was limited for shelf space around my computer hutch. The hard drive I was looking at was just too big physically. The floppy system fits in just right. It sits on top of the hutch above the computer and is within easy reach. I use it as a kind of mini-hard disk.

CN80 had just what I was looking for. Their 3.5-Inch external drive system appeared to fill my bill. So I sent away for a dual drive version of it. Two weeks later it was delivered to my door. I carefully unpacked the unit, read the easy to understand instruction sheet, and proceeded to hook things up. I had some problems due to the fact that my M4D is located within a computer "HUTCH" and the rear and underneath areas are hard to reach. After some physical contortions and much grunting and various assorted "deleted" comments I managed to make the connection. Following the instructions I turned on the drive power.......and wouldn't you know it, both the activity lights on the drives came on. According to the instructions that means I have the connector on backwards. I do think a paint mark on the end of the connector that goes toward the right or left side of the computer would have been helpful. Anyway I again went through the contortions, grunting, and more comments to remove, reverse, and re-connect it. I then turned on the drive power.......no lights! I turned on the computer and booted up in LSDOS 6.3.1. I entered the SYSTEM (drive=2,enable), SYSTEM (drive=3,enable), and SYSGEN commands as per instructions. I then placed a new 3.5" unformatted disk in drive 2 and 3. I entered "Format :2", answered the options questions and.......GLORY BE......the number 2 drive started working. It formatted the disk and when I did the same with drive :3....it also formatted ok. I entered "FREE" and got a listing of all four drives and their storage space. I was as happy as a skunk at a LITTLE STINKERS CONVENTION. I then proceeded to copy stuff to each drive, then I removed it, entered BASIC and found no problem accessing drive 2 and 3 from there. Everything I've tried so far works perfectly. But then, I was only testing. The real test has been in the weeks of general usage. So far the drives have performed beautifully. My first impression is very good.

The instructions mention changing the access delay time from .5 second to a full 1.0 second. I didn't do this. So far, I've detected no problems during my usage with it set at .5 second. If I have problems with I/O errors I shall certainly change it. The instructions are very clear on how to do it.

When I use my Model-4D in the Model-3 mode with LDOS 5.3.1, the Dos automatically finds the external drives and I can read either LSDOS 6.3.1 or LDOS 5.3.1 disks just as usual. The instructions say that TRSDOS 1.3 will also locate the external drives, and it does. However, I don't think you can format them for maximum storage like you can with LDOS or LS-DOS, especially these 3.5-inch. On any 6.3.1 bootable disk you must perform the System functions and build a config/sys (SYSGEN) file on each one. No problem!

One little oddity. When you list the directory, request a "free" or anything where the result indicates the disk size, it says it is a 5-Inch disk. This apparently causes no problem and if the computer can live with it, so can I.

Over-all I have a very positive impression of these drives. Other than a wish for a connector marker, I can find nothing to complain about. The construction, with its metal case, fine light grey color, and quiet, smooth operation is great. The attention to detail is impressive. Even the lower front corners of the case are beveled off to prevent gouging anything. The fit of the two drives within the case is smooth and clean. My compliments and two "atta-boys" to the maker of this drive.

So if you have a need for some extra storage but don't want to go all the way to a hard-drive; this is for you. I highly recommend this drive system. I can't speak about the 5.25-Inch versions but the 3.5-Inch is superb which would imply the 5.25-Inch is probably every bit as good.

That's all for now. Happy computing and may all your RAM be good.
-Robert Gore

(Editor's Note) The reason that the DEVICE command does not show 3.5 disks is that when it was written 3.5 drives were not thought of being installed in a Model 4, so it does not contain this size in its chart, it really is recognizing the 80 track drive as a 5.25 drive and the chart was never up dated. If it was, it would probably show every 80 track drive as 3.5 so the trade-off would be the same for those few that still have 5.25 80 track drives installed in their systems.

We do recommend delaying all new drives to 1 second delay, otherwise you will get directory read errors or file not found. But if you don't do it and have no problems that is ok too. Some programs do have a built-in timing delay that delays the reading of the disk that allow for a longer period of time from the turn on of the drive motor to the time the heads start to read. Other programs are to close in there timing delay tolerance code, so it causes the read error message. By setting the delay time in TRS/LSDOS 6.x to 1 second instead of .5 second you eliminate the problem with "most" but not all program usage, some programs still have too short a timing factor and the only way to correct it is to change the timing portion within the program itself. This can not be done without the source code or by the professional programmer. So we do recommend setting the delay to 1 second to eliminate as many problems as we can.

We thank Mr. Gore's enthusiastic endorsement of our product, and we too feel more comfortable with using 3.5 inch 720K drives instead of our hard drives. If you don't have any single files that exceed 700K in size then the 3.5 disk drive is the way to go.

One of the hard drive affectionados who has been hammering on us about owning a hard drive for three years without having any problems (we won't mention the brand or the users name) has just started to report problems he is having with his hard drives. It is only the naive hard drive user that expects to never have any problems, or perhaps it is just the sincere hopefulness on the part of the user that he will never experience hard drive problems. But the sad fact is that the hard drive, regardless of the make of the hard drive, or if it is connected to a Model 4, or installed in a MS/DOS IBM/Clone computer, you will begin to have hard drive problems eventually. The older hard drives had a manufacturers average life of five years. The newer hard drives as with all other manufactured items today are built with an even shorter average life of two years, thus it is a consumable computer product. Just as a laser printer has some electronic parts that should last forever, there are those consumable products such as toner, drums and fuser units that are consumable products. In a dot matrix printer the print head and printer ribbons are consumable products. Sometimes we think that the computer manufactures would like the whole computer to be made up of consumable products. One that would last just so many hours like light bulbs, then you would have to buy another one. How would like to have to buy a computer once a year if you used it everyday in your business? Computer technology hype is one method that is being used today to make you think that you need to buy a new computer every year. But we have to be a consuming society to keep our economy going, with as many people working as possible. That's just the way it is folks! Sorry for climbing on the soap box again. -Ed.

Using the MS-Utilities

Low Capacity Storage

by David P. Miller

Using the MS-Utilities with the minimum hardware configuration of 64K and two single-sided diskette drives requires a little extra effort. Since all TRS-80 operating systems require that certain system files be present on the diskette in order to do anything, the space available for file copies can quickly become limited. To provide the maximum available space, a "minimum system diskette" must be created which will be the source for files to be copied to an MS-DOS diskette, and the target for files copied from an MS-DOS diskette. To create such a diskette, place a new diskette in drive :1 and perform the following steps:

```
FORMAT :1 (SIDES=1,DDEN,CYL=40)
BACKUP /SYS:0 :1 (S)
```

At this point, you have created a diskette and installed the TRS-80 operating system on it. We will next remove files that will not be needed to use the MS-Utilities. Use the command:

```
PURGE :1 (S)
```

And type "Y", then press the [ENTER] key when DOS asks if it should purge the following files:

SYS0/SYS
SYS4/SYS
SYS5/SYS
SYS6/SYS
SYS7/SYS
SYS8/SYS
SYS9/SYS
SYS10/SYS
SYS11/SYS
SYS13/SYS

If some of the files listed above do not appear on the list, don't worry about it. Now place your working MS-Utilities diskette in drive :0 (created according to the instructions in the MS-Utilities manual), a diskette with the MS-Utility programs in drive :1, and copy the MS-Utility programs with the following commands:

```
COPY LFEOF/CMD:0 :1
COPY MSCOPY/CMD:0 :1
COPY MSDIR/CMD:0 :1
COPY MSFORMAT/CMD:0 :1
```

Type the command:

```
DIR :1 (I,S)
```

and you should see a listing containing 10 files using up 31.5K of space, with 148.5K free. This latter number, 148.5K, is the maximum size of a file that you will be able to copy.

Now, to use the MS-Utilities, place the newly created "minimum system diskette" in drive :0 and proceed as usual. *NOTE* that you only have four commands at your disposal with this diskette installed; MSCOPY, MSDIR, MSFORMAT, and LFEOF. When removing system files, you lose the use of the functions provided within each module. What is no longer available is shown in the table below according to the system files removed. The Library <A>, <B>, and <C> mentioned below are the commands displayed when the "LIB" command is used at the DOS Ready prompt. Note that the "LIB" command is in library <A> and can no longer be used if SYS6/SYS has been PURGEd.

SYS4/SYS	Text error messages
SYS5/SYS	DEBUG
SYS6/SYS	Library <A> commands
SYS7/SYS	Library <B> commands
SYS8/SYS	Library <C> commands
SYS9/SYS	DEBUG
SYS10/SYS	The ability to REMOVE a file
SYS11/SYS	JCL file processing

One final point: you may make a minimum system diskette WITHOUT installing the MS-Utility files, and use your regular working MS-Utility diskette in drive :0 when issuing the commands to invoke an MS-Utility program. When MSCOPY prompts you to insert the MS-DOS diskette, you may also insert the minimum system diskette in drive :0. With only the bare minimum of system files (SYS1, SYS2, SYS3, SYS12), you will have 165K of space available for copying files. Once the file is copied and the DOS Ready prompt reappears, return your normal system diskette to drive :0 before proceeding.
-David P. Miller

REMINDER

If the last four digits on your mailing label are 93/08, then this is your last issue. Time to get your renewal in the mail.

Moving?
Remember to send us your new address.

A VISIT WITH DAVID GOBEN

by David Goben

FFORMAT CORRECTION

Slippery fingers. Yeah! That's the ticket. Last month I provided a patch for FFORMAT 1.1.0 to default to 2-sided formatting. Even though this patch works, and in fact will default to formatting 2-sided disks, it will still =display= 1-sided as the default. Why? Because David mistyped a patch line. Why the program still shows 1-sided as the default instead of 2-sided is because the patch line that was supposed to cover the "[1],2" with "1,[2]" actually simply over-wrote the portion of data that =already= had the "1,[2]" data. So nothing was actually done. However, the first patch line did indeed changed the program to default to 2 sided; it is just that the prompt does not reflect it. What had happened in the second patch line is that the address over-written was at hex address 395B, but =should= have been 3954. Following are the correct patch lines:

```
patch fformat (x'34ee'=1)
patch fformat (x'3954'="1,[2]")
```

Opps. As it were.

MOUSE FIX/ENHANCEMENT

Speaking of patches, I'm beginning to think that Richard VanHouten's alter ego is Sherlock Holmes. He noticed that when sensitivity factoring is non-zero (sensistivity from 0 to 3 is allowed) that the mouse shifts slightly when a button is pressed. This does not happen in MagicDraw because the program always sets sensitivity to 0, where no problems occur. Richard managed to track the problem down to my factoring routine within the mouse plus driver. The solution is incredibly simple, and requires just a 1-byte patch, plus another one to upgrade the program's version number. The patches to MOUSE+ version 1.2 to bring it up to version 1.3 are:

```
patch mouse (d03,4d=33:f03,4d=32)
patch mouse (d07,7f=29:f07,7f=09)
```

Interestingly, this little patch adds a new feature to the mouse driver that is publicized to great proportions in the MS-DOS world, calling this feature "Dynamic Motion Support", or as "Intelligent Tracking Technology", to name only 2 bullets extolled by ad copywriters to describe an incredibly simple process. That process is: "the faster you move the mouse, the faster it moves." Now before you submit my name as the next contestant on "Masterminds of the Bleeding Obvious," let me clarify what was said. What I meant was that if you move the mouse faster, the mouse pointer will move even faster than that, in a proportional way. The units of motion on a mouse is called a "Mickey" (believe it or not) and if the factoring is set to 3, that means that moving 1 mickey in a given micro-slice of time, the factoring will cause it to "appear" to move 8 mickeys. This is because using this technique, you provide the program with a computed factor of the value, using as a factor the product of multiplying the mickey count times 2 to the power of the sensitivity value. Thus 1 is processed as 1 * 2^3, or 8. Moving twice as fast at 2 mickeys results in 2 * 2^3, or 16. 10 mickeys results in a returned movement of 80 mickeys. And so on.

Simple functions touted in ad copy as incredible programming feats is not new to computing. I recall one company in particular that once advertised in the old 80 MICRO magazine that declared that it was offering one of the most sophisticated loan amortization program ever developed using the latest in programming power for the incredibly low price of $19.95 for a limited time. Purchasers of the the product complained to 80 MICRO that what the got was no such thing, but was a BASIC program saved in ASCII format. I managed to track the program down to a simple program that had been on the computer bull-a-ton boards for a number of years. The advertisers had simply added their own copyright notices to the program, and sold it. But let's face it: how much math technology is required to compute loan amortizations? Hardly any. It's an incredibly simple process. So even though what these pranksters may have done was not ethically right, they were not lying when they claimed the program was one of the most sophisticated. Hey, it worked quickly, even.

DISKOPT ENHANCED

Though no more bugs have been reported, I have enhanced the =appearance= of my Disk Optimization program. Since this is simply an enhancement to the cosmetics of the program, previous purchasers will not be upgraded as they would be automatically if a bug had been found. So if you have a version previous to 1.0.2 and would like to upgrade, simply return your =original= DISKOPT disk to CN80 along with a $5 refresh charge, and they will upgrade your disk to the new version (version 1.0.2).

What this enhancement amounts to is in the way that disk reads and writes are displayed on the screen by the DISKOPT/CMD program. Up through version 1.0.1, while a granule is read, a reverse video "R" is displayed on the disk map at the target granule, and once it is finished, it is replaced by a ".". Similarly, while a granule is being written, a reverse-video "W" is displayed on the disk map at the target granule, and once written, it is replaced by an "x". I have changed this so that consecutive reads are cumulatively displayed on the screen, and are not reset to periods until the actual writing operation begins. Likewise, writes are not reset to x's until all writes are done. This enhancement simply clarifies the operations being done, giving you a clearer picture of where data is moving from and to. Probably not an earth-shaking development, because the actual program still operates =exactly= the same, but a number of people had requested this feature be added to a future version. The future is here.

Z80 PIN 27

Numerous queries have been made about pin 27 on the Z80 CPU chip in the Model 4, and if it indeed speeds up operations. The answer depends upon if you have a non-gate-array or a gate-array version Model 4. If you have a gate-array version, such as the Model 4D, or a Model 4 that has its disk controller and RS-232 and sound control all built into the main (mother) board, then bending up pin 27 may result in your computer refusing to operate. Besides, these computers =do= operate at a full 4MHz already. However, if you have a non-gate-array Model 4, which has separate boards for floppy control, RS-232, and sound (and I can only assume that this would also apply to a Model III as well), then bending up pin 27 =will= result in faster operation. Indeed, leaving this pin plugged in results in a Model 4 operating at much less than the 4MHz it is advertised to operate at. By bending this pin up, the

computer will afterward operate flawlessly =at= a true 4MHz.

A person's next question may be -- which pin is pin 27? The Z80 supplied with the Model 4 is a 40-pin dip package, with 20 pins on each side. If the chip were placed vertically, with the dimple indentation at one end oriented at the top, pin 1 would be the top-most pin on the left side. Pin 2 is directly below that. And so on, down to pin 20, located at the bottom left. Pin 21 is located at the bottom right corner. Thus pin 27 is the 7th pin up from the right side. All one needs to do is to =carefully= bend it upward at the "elbow" in the leg just enough (about 45 degrees) so that it will not go back into its normal socket when the Z80 is plugged back in to the Z80 socket (making sure to of course reinsert the chip with the same orientation it had when it was removed, matching the dimple with the schematic dimple printed on the board). That's all there is to it.

POWER SUPPLY NEEDS

One person wants to know if their Model III power supplies are big enough to support a hard drive. Yes, they are, unless they are one of those prehistoric beasts that are almost as big as the computer itself. Most available hard drives (i.e., those that are still capable of functioning) use about half, or even less than the power required by the floppy disk drives supplied with the original Model IIIs. Newer floppies are less power hungry as well. For example, 2 half-height floppies uses less power than one full height floppy. 2 half-height hard disks use about the same amount of power as a full-height floppy, though some of the more recent IDE and SCSI hard disk drives use much less.

WHAT IS IN A NAME?

MFM. RLL. SCSI. IDE. What is all this, anyway? Well, all we really need to know is that currently our TRS-80 computers have been adapted to MFM type hard disks. These format to 32 sectors per platter cylinder (a platter is an internal disk in the hard drive). RLL uses a different type of encoding, and can format a much higher number of sectors per platter cylinder, but the 32-sectors per cylinder design of the MFM format was more in line with the needs of the TRS-80, and so RLL was not adopted. Now I understand that both MFM and RLL type hard disks are out of production. This leaves IDE and SCSI.

IDE drives are simpler to control because the hard drive itself basically contains its own controller, and any controller card attached to it simply adapts the computer's data bus with that of the IDE drive. Indeed, I have a number of IDE controller cards that I have collected that barely have any circuitry on them at all. One of them is 1 inch by 4 inches, and most of it is taken up by the card edge connector. Because of this, most controller card manufacturers add "extras" to them, perhaps to entice purchasers to buy their card. Such enhancements are presented usually on 4 inch by 4 inch cards, and adding serial and parallel circuitry (sometimes 2 of each), support for 2 floppy disks, and often have light pen pin connectors, and often feature a game port (joy stick adapter port).

SCSI interfaces are much like IDE interfaces in many respects, but it is an attempt to standardize peripheral interfacing, so that a SCSI controller can be used to control not only a hard disk, but many other devices as well, and some have even been connected to form a network system, where more than one computer can use the SCSI device, such as a hard disk, from one of the computers.

So standards are always changing. This is the price of progress. But don't worry. The next time some engineer gets a brainstorm, we'll be adding another anagram and standard to our list of "what-is-its".

HAIR PULLING

As I continue to refine my skills at slowly developing a solar panel for extended brain power, I often help it along by grabbing a fist full of dead protein and giving it a tug from the cranial area.

A problem one casual user of the TYPITALL word processor noted that the I/O-Bus Clock stops running when using the program. Well, the clock does not actually quit running; it is just that the real-time clock function in the computer, and not in the I/O-Bus Clock, is turned off by TYPITALL. Spending the time to track the switch within the program that turned off the clock interrupt brought to light =why= the clock was being turned off by TYPITALL: if the clock is not turned off, the computer gets goofy and begins typing out its own garbage text, taking over the keyboard and preventing you from getting it back, short of a reboot. And so what I thought was going to be a simple patch turned out into a defeat in at least that direction. Of course, my advice would have been for that individual to have purchased my SCRIPT package from CN80 in the first place, but I think that would be a bit biased. Of course, SCRIPT works fine with the clock, and does not lock it up.

OH SAY CAN YOU C

It has come to my attention that there is a public domain TRS-80 version of Small C derived from the original code (the original program was written by Ron Cain). So what? I am aware of that version, and it is so limited that it is not worth one's time or trouble, unless you want to see the inner workings of a =very limited= C compiler. Ron's original compiler (for CP/M) was published in the May 1980 issue of Doctor Dobb's Journal (a magazine that is a =must-have= for serious programmers -- not for novices). I even have a copy of this CP/M version that I had obtained from CN80's own CP/M Public Domain library on disks LNG002 and LNG003. Ron Cain later encouraged James E. Hendrix to effect further development on the compiler, which was later published in the December 1982 issue of DDJ. This newer version is =not= public domain (although about every BBS treats it as such), but is shareware. Mr. Hendrix even published a book relating a newer version of his published program, called "The Small C Handbook", published by Reston Press. This book is now published by M&T Books for $17.95 plus $2.95 S&H. You can also order the book and the companion CP/M disk for $37.90 plush $2.95 S&H, if you wish.

With all due respect to Ron Cain, James Hendrix's newer version makes Ron's original compiler look like a cheap toy. Aside from the introduction of a separate standard library that Mr. Hendrix and E. Payne developed, which was totally lacking in Ron's version, it also fixed up a lot of the many deficiencies of the original version, which had lacked code optimization, data initialization, conditional compilation, the "extern" storage class, the "for", "do...while", "switch", and "goto" statements, assignment operators, Boolean operators, the one's compliment operator, and a whole slew of other important features. Needless to say, Ron's pioneering effort had a =lot= of room for improvement. This is why I say "so what" to a TRS-80 version of =that= compiler, which in my option, aside from the appreciation that Ron got the ball rolling, is basically useless to almost any real C programmer.

My own efforts have been to dramatically improve the compiler written by Mr. Hendrix, with his cooperation, until it has become a whole new product, completely separate from any previous generation of the program. Therefore, what you get from my "Model 4 Small C" version versus the version that a certain R.S. feels is so important to disseminate through F.S., is a much superior product, between which there is no real or fair comparison of the two. I was basically asked by R.S. (remotely, in a published letter) "Where have I been," not to be aware of that older Small C product. I have been here the whole time, R.S., working with the progenitors of that product to make =dramatic= improvements and provide a much more useful, and superior product. Indeed, the other day I received a letter from Mr. Hendrix who stated that he was literally floored by my work, never thinking that the project could be taken so far forward, until it is almost a Full C compiler.

So, R.S., where have =you= been? If you had but taken the time to take a real look at the program that you had spent so much time digging out of your archives, you would have plainly seen how simple and crude it was, and that it in no way can compete with my own product. It would be like comparing the structural difference of a pup tent and a house. Isn't second hand information a dangerous, and embarrassing weapon to wield? (See my last month's column to see what second hand information had done to me!)

Small C FUN

All senseless bickering aside. For your entertainment, I am presenting this month a BASIC and C version of a program written back in ancient times (cira 1975), back in the days when video monitors were just a twinkle in some computer hacker's eye, and BASIC's very basic origins used PRINT statements to hammer out data onto some loud and clanky teletype machine, instead of the screen.

Program listing 1 is such a BASIC program. Program Listing 2 is a Small C version of that program. You may find it educational to examine the programs side-by-side to see how each language does its magic. Note that to convert the C version of the program to an executable file, type it into a text editor, such as Mark Reed's EDIT program, and save it to a file called BUNNY/C. Next, compile it under Small C using the commands (assuming it is on drive :1) :

```
SCC BUNNY:1 -A -P -L2
SCCOPT BUNNY:1 -M
MAC BUNNY:1 -NM -P
SMLNK BUNNY:1 C/LIB
```

Afterward, if you simply enter BUNNY, the program will list out onto the screen. If you redirect the output using the command:

```
BUNNY >*PR
```

The output will go to the printer.

Try running it side-by-side with the BASIC version and compare speeds. By the way, if you have not guessed, this program displays the famous Playboy Bunny (rabbit, darn it!)

SMALL C AWARI

One program that will be included on the next CN80 Disk Series, that I wish could be printed in this magazine (but it would be over 12 pages long!), is a C version of AWARI, an ancient African game of skill. It goes by various names, including WARI. Basically the game consists of 6 pits on each player's side, which are initially filled with 3 stones or pebbles, and an additional, initially empty "home" pit. The object of the game is to get as many stones into one's home pit before one player's side is empty, which ends the game. This is much harder to do than what you might think. You will learn fast that this easy to learn game requires cunning skill.

In 1978 I took the original program (published in 1978), which was very crude and limited to main frame computer hard copy printouts. I added lo-res graphics, cleaner operation, and friendlier presentation, including displayed instructions. In the C version, which I recently developed under Small C, I have taken advantage of the program's =much= faster execution speed under Small C, and have added much more aggressive "intelligence" to the program. Even so, the computer player still plays so fast that I was forced to insert program pauses prior and following the computer's moves, so that the biological player has time to mentally catch up, and to prevent them from suspecting underhanded tricks on the part of their computer opponent.

One of the main reasons why I would have liked to have the program printed here for your inspection in the issue is because of all the neat functions I put into it, that make translating a program from BASIC to C a relatively easy breeze. For example, the locate() function positions the cursor anywhere on the screen, printat() places the cursor at a screen position and prints text, qinput() manages user responses to prompts, string() simulates the PRINT STRING$() function, tab() simulates screen tabbing, and so on. Also, I included a pause() function that will cause the program to suspend operations for a selected number of whole seconds. Additionally, a wrap() function prints out a stream of text on the screen, and processes word-wrap, so that words are not broken up at the end of a line, but will be automatically wrapped around to the next line.

If you do not have Model 4 Small C, then you can still enjoy the program, because the next Disk Series will also feature an executable version of the program, already compiled, called AWARI/CMD, which you can execute and enjoy from the DOS Ready prompt.

One of the really neat features of this program is that it has a built-in learning function, which means that it becomes more intelligent with each game it plays. It is sort of a slim interpretation of artificial intelligence. It checks for its previous mistakes, and tries to improve on them, using different strategies to better win a game. Have fun with it.

Well, I guess I've gotten a bit long winded. I tend to do this when I begin a column that I feel I have not enough ideas for. So until next issue, Happy Computing!
-David Goben

STAR CLUSTER

by Robert D. Gore

I like to play around with programing. STARS4/BAS is a program (see program listing number three) I started a couple of years ago. It is an exercise I began to better learn what I could do with BASIC. As it stands right now it is still in the metamorphosis of revising. This listing is about the 10TH revision so far. It still has logic errors and there are undoubtedly better ways to accomplish the same thing. That is why I'm putting this into the public domain; to see if anyone has suggestions and ideas to make this a better working program. I did this once before with a previous program and received some great ideas from Richard Snow through CN80. I'd like to take this opportunity to thank Mr. Snow for those points. Makes me say "Why didn't I think of that??!!"

The program is basically a simulation of a small star cluster brought into being within the void of the computer. Then random factors take over to make changes in each star system. Planets develop, life begins, disasters befall them, life ends, and sometimes one star system will really go forward in spite of all. .....Then there is the "GOD FACTOR".......This allows one to intervene in the development of a star or planet. One can help..... or destroy a budding civilization. You may watch things happening on the message line at the bottom of the screen and/or you can have significant events printed out to the printer.

A breakdown of the program:

Lines 1 - 8: Credits and program name.
Lines 9 - 160: Initialization of arrays, random factors, message line, hard copy, etc.
Lines 164 - 240: Main program loop calling different procedures.
Lines 245 - 251: Planet habitability check where it is determined if planet is capable of supporting life.
Lines 299 - 430: Where system messages are processed and dealt with.
Lines 449 - 470: This updates the (so far) limited graphics.
Lines 499 - 615: Star check routine where the state of the star is monitored and determines whether planets have formed.
Lines 619 - 630: Survivor routine to determine if there are any survivors from planetary disasters.
Lines 799 -1070: Planet check routine where changes in the planets are monitored and dealt with.
Lines 1099-1200: "GOD FACTOR" routine controller. Where you are given a chance to intervene.
Lines 1209-1255: Routines to handle God Factor requests.
Lines 1259-1267: routines to collect God factor input.
Lines 1299-1440: Interstellar travel routine where one star system reaches another and the results are determined.
Lines 1500-1730: More routines to handle God Factor requests.
Lines 1749-1755: Survival routine for God factor destruction.
Lines 1759-1761: Does star have planets check routine.
Lines 9999-10001:Program self saver...just type goto 10000 to activate.

The main arrays that keep track of things are:

STAR(7,5)= 0:age of star. 1:planets (y/n). 2:life factor. 3:stability factor. 4:nova (y/n).
The age of the star is self explanatory, as is planets (y/n). Life factor is a random figure that is used to indicate whether star is capable of life in the system. The stability factor is an indicator of how stable the star is. If it gets too unstable it will become a nova and likely wipe out all life in the system. This in turn would turn on the nova (y/n) entry to show that this is a nova star.

PLANET(7,5)= 0:habitable (y/n). 1:life probability. 2:intelligent life (y/n). 3:development stage. 4:colonized/conquered.
The habitable indicates whether the planet is capable of life. Life probability gives a factor used to calculate when life can begin. Intelligent life indicates whether intelligence has risen among the life-forms. Development stage indicates the approximate level of technology of the life forms. The colonized/conquered is used only when the star is reached by another star-system's life forms that have achieved interstellar capability.

FACTOR(7,4)= 0:intelligence probability. 1:aggressive factor. 2:disaster factor. 3:development variable.
These are factors set up to cause a randomness in probabilities. Intelligence probability is used in the calculation of when intelligent life begins. Aggressive

factor is used to calculate such things as how fast a life form develops, how well it survives disasters, and other such things where an aggressive society will outlast a lesser such society. Disaster factor is used to calculate how likely a disaster is to happen. The development variable is used to help in calculating the advance of a life forms technology.

I have tried to use a procedural approach to writing this program, whereas the main routines call subroutines to process the data. I have not managed to avoid the hated "GOTO", however. It's so useful; even if it does cause spaghetti code.

STARS4/BAS has some of the same ideas as the much more elaborate PC program SIMEARTH. I wanted to create a program to simulate all the trials and tribulations of a world and its life forms. My future plans for this program include giving the civilizations on the planets more intelligence; a sort of artificial intelligence. I would like to clean up the probability factors somewhat. I have no idea about the theories of probability involved; I just made guesses in the program. I would like to increase the "GOD FACTOR" abilities somewhat to make finer adjustments to the civilizations. I would like to <jazz> up the graphics a bit more. And there are a number of other ideas coagulating in the back of my mind. Plus I'd like to clean up some nagging bugs in the program. So you see, this program is unfinished even though it is a working program. As I said; I'm open to any and all suggestions and ideas for improving it. I love messing with it to see what a small change will do. Sometimes my "messing" makes a real mess that I have to clean up, but I love doing it.

I have let this program run for an hour or more several times. It is interesting that so far none of the civilizations get much past the atomic age stage before they crash. I did see one reach the interplanetary exploration stage once, but then the <program> crashed. So far the only way I've gotten a planet to reach the interstellar stage is by using the "GOD FACTOR". It looks like mortal life forms need a lot of outside help.

Note: The "GOD FACTOR" choices are defined in a rem statement in that part of the program. I haven't designed a way to display them in full; just mnemonics called by number.

This has been a fun program to write. I began by figuring it out on paper. Then I entered sections of it into my model-100 laptop computer using its TEXT feature. I then uploaded each section to the model-4D and merged them together. I still use the same procedure for any large additions or changes to the program. I like to use the M100 for this because it is so portable. Sometimes I like to do my thinking under a tree at the lakeside.

Well, that's the story. I hope you like the program. If anybody is interested in future developments for this program, let me know and I'll write another article on it if I've come up with any new additions. Until then, May all your bad bytes be little ones. So long.
-Robert Gore

Submitting Articles and Programs

Contributions to CN80 are valued from anyone. We want CN80 to be as varied and as helpful as possible.

Programs and articles must be on a disk saved in ASCII and have a hard copy enclosed.

Programs submitted for publication in CN80 must be released into the Public Domain.

Shareware and PD programs for the File Cabinet Library are welcome and will be reviewed in future issues.

Mail to:
Computer News 80
PO Box 680
Casper, WY 82602

Material submitted cannot be returned.

BUNNY/BAS PROGRAM LISTING NUMBER ONE by David Goben

```
100 'BUNNY/BAS -- PRINT PLAYBOY BUNNY
110 'NOTE: CHANGE PRINT COMMANDS TO LPRINT TO GET HARD COPY
120 CLS:DEFINT A-Z
130 BUNNY$="BUNNY"
140 PRINT STRING$(6,10);
150 POSN=0
160 READ BYTE
170 IF BYTE<>-1 THEN 210
180 PRINT:POSN=0
190 BUNNY$=MID$(BUNNY$,2)+LEFT$(BUNNY$,1)
200 GOTO 160
210 IF BYTE=127 THEN PRINT CHR$(12);:END
220 PRINT STRING$(BYTE-POSN," ");
230 READ OFST
240 FOR POSN = BYTE TO OFST
250 PRINT MID$(BUNNY$,(POSN MOD 5)+1,1);
260 NEXT POSN
270 GOTO 160
280 'BUNNY DATA
290 DATA 1,2,-1,0,2,45,50,-1,0,5,43,52,-1,0,7,41,52,-1
300 DATA 1,9,37,50,-1,2,11,36,50,-1,3,13,34,49,-1,4,14,32,48,-1
310 DATA 5,15,31,47,-1,6,16,30,45,-1,7,17,29,44,-1,8,19,28,43,-1
320 DATA 9,20,27,41,-1,10,21,26,40,-1,11,22,25,38,-1,12,22,24,36,-1
330 DATA 13,34,-1,14,33,-1,15,31,-1,17,29,-1,18,27,-1
340 DATA 19,26,-1,16,28,-1,13,30,-1,11,31,-1,10,32,-1
350 DATA 8,33,-1,7,34,-1,6,13,16,34,-1,5,12,16,35,-1
360 DATA 4,12,16,35,-1,3,12,15,35,-1,2,35,-1,1,35,-1
370 DATA 2,34,-1,3,34,-1,4,33,-1,6,33,-1,10,32,34,34,-1
380 DATA 14,17,19,25,28,31,35,35,-1,15,19,23,30,36,36,-1
390 DATA 14,18,21,21,24,30,37,37,-1,13,18,23,29,33,38,-1
400 DATA 12,29,31,33,-1,11,13,17,17,19,19,22,22,24,31,-1
410 DATA 10,11,17,18,22,22,24,24,29,29,-1
420 DATA 22,23,26,29,-1,27,29,-1,28,29,-1
430 DATA 127
```

BUNNY PROGRAM LISTING NUMBER TWO WRITTEN IN SMALL C by David Goben

```
/*******************************************************************
** BUNNY.C
** display or print PLAYBOY(R) Bunny
** usage: BUNNY [>*PR]
*******************************************************************/

#include <stdio.h>

        /* pre-define C/LIB functions */
extern putchar(),                  /* put char to stdout */
        poll(),                    /* poll keyboard */
        fputs(),                   /* send string out */
        exit();                    /* exit to operating system */
```

Cont'd on next page.

```
     /* pre-define user function */
void string(int count, char byte);

/*****************************************************************/
char bunny[]= "BUNNY",                   /* static data */
     data[] = {                          /* position info */
  1,2,-1,0,2,45,50,-1,0,5,43,52,-1,0,7,41,52,-1,
  1,9,37,50,-1,2,11,36,50,-1,3,13,34,49,-1,4,14,32,48,-1,
  5,15,31,47,-1,6,16,30,45,-1,7,17,29,44,-1,8,19,28,43,-1,
  9,20,27,41,-1,10,21,26,40,-1,11,22,25,38,-1,12,22,24,36,-1,
  13,34,-1,14,33,-1,15,31,-1,17,29,-1,18,27,-1,
  19,26,-1,16,28,-1,13,30,-1,11,31,-1,10,32,-1,
  8,33,-1,7,34,-1,6,13,16,34,-1,5,12,16,35,-1,
  4,12,16,35,-1,3,12,15,35,-1,2,35,-1,1,35,-1,
  2,34,-1,3,34,-1,4,33,-1,6,33,-1,10,32,34,34,-1,
  14,17,19,25,28,31,35,35,-1,15,19,23,30,36,36,-1,
  14,18,21,21,24,30,37,37,-1,13,18,23,29,33,38,-1,
  12,29,31,33,-1,11,13,17,17,19,19,22,22,24,31,-1,
  10,11,17,18,22,22,24,24,29,29,-1,
  22,23,26,29,-1,27,29,-1,28,29,-1,
  127};
/*----------------------------*/
/* NOTE:                      */
/* 127=mark end of data array. */
/* 1st byte is left position.  */
/* 2nd value is right position.*/
/* If -1, then end of line.    */
/*----------------------------*/
/*****************************************************************/


/*
** begin program ----------------------------------------------
*/
main() {
  int begin; char ch, *tptr, *dptr;
  dptr  = data;
  begin = 0;
  fputs("\x1c\x1f",stderr);             /* clear screen */
  string(6,'\n');                        /* heading space */
  while(*dptr != 127) {                     /* loop until end marker */
    switch(*dptr) {
      case -1: {
        putchar('\n');                   /* terminate line */
        begin = 0;                          /* reset position marker */
        ch = *bunny;                         /* save first character of name */
        tptr = bunny;                      /* point to start of name */
        while(tptr[0]=tptr[1]) ++tptr; /* shift name left */
        *tptr = ch;                        /* place 1st char at end */
        poll(1);                         /* check keyboard */
        break;                             /* done with case */
        }
      default: {                           /* process line info */
        string(*dptr-begin,' ');        /* tab to start position */
        begin = *dptr++;
        while(begin <= *dptr)              /* bump to end position */
          putchar(bunny[begin++ % 5]); /* write bunny name data */
```

Cont'd on next page.

```
        }                                 /* end default case */
      }                                   /* end of switch block */
     ++dptr;                              /* bump pointer */
     }                                    /* end of primary while loop */
  putchar('\f');                       /* form feed */
  exit(0);                               /* exit to system */
  }                                       /* end of main() function */

/*
** display string of data ---------------------------------------
*/
string(count, ch) int count; char ch; {
  while(count--) putchar(ch);
  }

/***** END OF PROGRAM *****/
```

STARS/BAS PROGRAM LISTING NUMBER THREE by Robert D. Gore

```
1 '*****************************************************************************
2 '*                          ----- S T A R S / B A S -----                   *
3 '*                          -----    by R.D.Gore -----                    *
4 '*                                    ********                              *
5 '*  A tiny star-cluster within the computer that lives or dies at the whim  *
6 '*    of random factors or the "God factor".                                *
7 '*                                                                          *
8 '*****************************************************************************
9 '*** INITIALIZE ***
10 CLS:CLEAR 0:DIM
 STAR(7,5),PLANET(7,4),FACTOR(7,4),LOCATE(7,2),DEVELOPMENT$(15):YEAR=1:PR5=10:RANDOM
20 FOR X=1 TO 7:STAR$(X)="*":NEXT
30 FOR X=0 TO 15:READ DEVELOPMENT$(X):NEXT
40 FOR X=1 TO 7:READ DISASTER$(X):NEXT
50 FOR X=1 TO 7:READ LOCATE(X,1),LOCATE(X,2):NEXT
55 FOR X=1 TO 7:FACTOR(X,0)=RND(3):FACTOR(X,1)=RND(3):FACTOR(X,2)=RND(3):NEXT
56 FOR X=1 TO 7:STAR(X,2)=RND(30):PLANET(X,1)=RND(15):NEXT
60 DATA "NO LIFE..","PRE-STONE-AGE","STONE AGE","TRIBAL-NOMADIC","FIRST CITIES-PRIMITIVE","FIRST
 ORGANIZED CIVILIZATIONS","EMPIRES RISE AND FALL","SCIENCE BEGINS","EXPLORATION OF
 PLANET"
70 DATA "TECHNICALLY ADVANCED","PRE-ATOMIC","ATOMIC AGE","SPACE
 AGE","INTERPLANETARY","STELLAR CAPABILITY","SUPER CIVILIZATION"
80 DATA "ICE AGE","COMET HIT","ASTEROID HIT","DISEASE-PLAGUE","PLANETWIDE POLLUTION","MAJOR
 WARS","DARK AGE"
90 DATA 3,10,4,35,5,20,10,60,11,30,18,40,20,50
100 FOR X=1 TO 7:PRINT @ (LOCATE(X,1),LOCATE(X,2)), STAR$(X):NEXT
110 PRINT @ (22,1), STRING$(78,"-"):CLEARLINE$=STRING$(78," ")
120 PRINT @ (23,1), "MESSAGE LINE....DO YOU WISH HARDCOPY (Y/N): ";
130 A$=INKEY$:IF A$="" THEN 130
140 IF A$="Y" OR A$="y" THEN PRT=1 ELSE PRT=0
145 IF PRT=1 THEN LPRINT "FACTORS:":FOR X=1 TO 7:LPRINT "STAR: ";X:LPRINT
 FACTOR(X,0),FACTOR(X,1),FACTOR(X,2),FACTOR(X,3):NEXT X:LPRINT STRING$(70,"=")
150 PRINT @ (23,1), CLEARLINE$;:PRINT @ (23,1), "MESSAGE LINE....PRESS <ENTER> TO BEGIN: ";
160 A$=INKEY$:IF A$<>CHR$(13) THEN 160
```

Cont'd on next page.

```
164 '*** MAIN PROGRAM LOOP ***
165 FOR N=1 TO 7
170 GOSUB 500
175 IF STAR(N,1)=1 THEN GOSUB 250
180 GOSUB 300
190 GOSUB 800
195 IF PLANET(N,3)=14 THEN GOSUB 1300
200 GOSUB 300
220 NEXT N
225 GOSUB 1100
226 GOSUB 450:CCT=CCT+1
230 YEAR=YEAR+1:IF YEAR>PR5 THEN PR5=YEAR+9
235 IF PRT=1 AND PR1=-1 THEN LPRINT STRING$(10,"="):PR1=0
240 GOTO 165
245 '*** PLANET HABITABILITY CHECK ***
250 IF STATE(N)=0 THEN RNF=RND(10):IF RNF<5 THEN PLANET(N,0)=-1 ELSE
 PLANET(N,0)=1:PLANET(N,3)=0:STATE(N)=1
251 RETURN
299 '*** MESSAGE HANDLER ***
300 PRINT @ (23,1), CLEARLINE$;:MSGCOUNT=0
310 FOR X=1 TO 10:IF MSG$(X)<>"" THEN MSGCOUNT=MSGCOUNT+1
312 NEXT
320 IF MSGCOUNT>0 THEN PR1=-1:GOTO 350
330 PRINT @ (23,1), "NO.";N;"    NO MESSAGES FOR EPOCH: ";YEAR;:GOSUB 420
340 RETURN
350 PRINT @ (22,1), "EPOCH: ";YEAR
360 FOR X=1 TO 10:IF MSG$(X)="" THEN 400
370 PRINT @ (23,1), MSG$(X);:IF PRT=1 AND (STATE2=1 OR YEAR=PR5) THEN LPRINT "EPOCH
 :";YEAR;" ";MSG$(X):LPRINT
380 IF PRT=1 THEN GOSUB 420 ELSE GOSUB 430
390 PRINT @ (23,1), CLEARLINE$;:MSG$(X)=""
400 NEXT
410 STATE2=0:RETURN
420 FOR TIMER=1 TO 1000:NEXT:RETURN:'*** TIMER LOOP ***
430 FOR TIMER=1 TO 1500:NEXT:RETURN
449 '*** GRAPHIC UPDATE ***
450 IF CCT=5 THEN CCT=0:GOTO 460
455 IF STATE<1 THEN RETURN
460 FOR X=1 TO 7:PRINT @ (LOCATE(X,1),LOCATE(X,2)), STAR$(X);:NEXT
470 STATE=0:RETURN
499 '*** STAR CHECK ROUTINE ***
500 STAR(N,0)=STAR(N,0)+1:IF STAR(N,1)<>1 THEN 525
510 IF STAR(N,2)>=6 AND STAR(N,4)=-1 THEN MSG$(1)="STAR: "+STR$(N)+" WENT NOVA - SOME
 SURVIVORS...":STAR$(N)="O.":STATE=1:STATE2=1:RETURN
520 IF STAR(N,2)=0 AND STAR(N,4)=-1 THEN MSG$(1)="STAR: "+STR$(N)+" WENT NOVA - LIFE
 FORMS DESTROYED!":STAR$(N)="+.":STATE=1:STATE2=1:RETURN
525 IF STAR(N,4)=-1 THEN MSG$(1)="STAR: "+STR$(N)+" WENT NOVA - DEAD
 SYSTEM.":STAR$(N)="O":STATE=1:PLANET(N,2)=0:PLANET(N,3)=0:STATE2=1:RETURN
540 IF STAR(N,3)>25 THEN DANGER=1:MSG$(1)="STAR: "+STR$(N)+" UNSTABLE -
 DANGER!":STATE2=1
550 IF STAR(N,3)>35 THEN STAR(N,4)  =-1:MSG$(1)="STAR: "+STR$(N)+" GOING
 NOVA.....*******":STATE2=1
560 RNF=RND(10):IF RNF>8 THEN STAR(N,3)=STAR(N,3)+1
570 IF RNF<3 THEN STAR(N,3)=STAR(N,3)-1
580 IF DANGER=1 THEN STAR(N,2)=STAR(N,2)-1
590 IF STAR(N,4)=-1 THEN GOSUB 620
```

Cont'd on next page.

```
600 MSG$(2)="STAR: "+STR$(N)+"    LIFE FACTOR: "+STR$(STAR(N,2))+"    STABILITY:
 "+STR$(STAR(N,3))+"    AGE: "+STR$(STAR(N,0))
610 IF STAR(N,1)<>1 THEN RNF=RND(1000):IF (RNF+STAR(N,3))>900 THEN
 STAR(N,1)=1:STAR$(N)="*,":STATE=1:MSG$(3)="PLANETS HAVE FORMED AROUND STAR.":STATE2=1
615 RETURN
619 '*** SURVIVOR ROUTINE ***
620 RNF=RND(4):IF (RNF+FACTOR(N,1))<6 THEN STAR(N,2)=0 ELSE
 STAR(N,2)=RNF+FACTOR(N,1):RETURN
630 RETURN
799 '*** PLANET CHECK ROUTINE ***
800 RNF=0:IF STAR(N,1)<>1 THEN MSG$(1)="STAR: "+STR$(N)+" HAS NO PLANETS.":RETURN
805 IF STAR(N,4)=1 THEN RETURN
810 IF PLANET(N,0)=-1 THEN RETURN
815 IF PLANET(N,2)=1 THEN 910
820 IF PLANET(N,1)>5 AND STAR(N,2)>10 THEN RNF=RND(50) ELSE GOTO 850
830 IF RNF>25 THEN PLANET(N,1)=PLANET(N,1)+1:MSG$(1)="PLANET: "+STR$(N)+" LIFE PROBABILITY
 INCREASED.":STATE2=1
840 IF RNF<10 THEN PLANET(N,1)=PLANET(N,1)-1:MSG$(1)="PLANET: "+STR$(N)+" LIFE PROBABILITY
 DECREASED.":STATE2=1
850 RNF=0
860 IF PLANET(N,1)<10 THEN RETURN
870 IF PLANET(N,2)<>1 THEN RNF=RND(50)
880 IF (RNF+FACTOR(N,0))>50 AND (RNF+FACTOR(N,0))<54 THEN PLANET(N,2)=1
890 IF PLANET(N,2)=1 AND PLANET(N,3)=0 THEN MSG$(2)="PLANET: "+STR$(N)+" INTELLIGENT LIFE
 BEGINS.":PLANET(N,3)=1:STAR$(N)="*.":STATE=1:STATE2=1
900 FACTOR(N,1)=RND(3)
910 MSG$(1)="PLANET: "+STR$(N)+"    DEVELOPMENT: "+DEVELOPMENT$(PLANET(N,3))+"    EPOCH:
 "+STR$(YEAR)
920 RNF=RND(100):RNF=RNF+FACTOR(N,2)
930 IF RNF=10 OR RNF=25 OR RNF=77 OR RNF=92 THEN DISASTER=1:GOTO 990
940 RNF=RND(10):FACTOR(N,3)=FACTOR(N,3)+(FACTOR(N,1)*RNF):RNF=0
945 IF PLANET(N,4)=1 THEN RNF=RND(50):IF RNF<45 THEN GOTO 970
950 IF FACTOR(N,3)>125 THEN PLANET(N,3)=PLANET(N,3)+1:MSG$(2)="CHANGE IN DEVELOPMENT
 STAGE:"+DEVELOPMENT$(PLANET(N,3)):FACTOR(N,3)=0:STATE=1:STATE2=1
955 IF PLANET(N,3)>13 THEN STAR$(N)="--*.--"
970 'MSG$(2)="NO CHANGE IN DEVELOPMENT STAGE."
980 RETURN
990 RNF=RND(7):MSG$(2)="PLANET: "+STR$(N)+" HAS PLANETARY DISASTER: "+DISASTER$(RNF)+"
 EPOCH: "+STR$(YEAR)
1000 IF RNF=1 OR RNF=4 OR RNF=7 THEN PLANET(N,3)=(PLANET(N,3)-2)+FACTOR(N,1)
1010 IF RNF=2 OR RNF=3 THEN PLANET(N,3)=(PLANET(N,3)-4)+FACTOR(N,1)
1020 IF RNF=5 THEN PLANET(N,3)=PLANET(N,3)-1
1030 IF RNF=6 THEN IF PLANET(N,3)>=9 THEN PLANET(N,3)=(PLANET(N,3)-4)+FACTOR(N,1):GOTO
 1050
1040 IF RNF=6 THEN IF PLANET(N,3)>7 THEN PLANET(N,3)=PLANET(N,3)-1
1045 IF PLANET(N,3)<0 THEN PLANET(N,3)=0
1050 MSG$(3)="STAR:"+STR$(N)+" DISASTER CHANGES DEVELOPMENT
 STAGE:"+DEVELOPMENT$(PLANET(N,3)):FACTOR(N,3)=0:STATE2=1
1060 IF PLANET(N,3)<0 THEN MSG$(4)="LIFEFORMS DESTROYED BY DISASTER
 ***":PLANET(N,2)=0:PLANET(N,3)=0:STATE2=1:STAR$(N)="*+":STATE=1
1070 RETURN
1099 '*** GOD FACTOR ROUTINE ***
1100 PRINT @ (23,1), CLEARLINE$;:MAN=0
1110 PRINT @ (23,1), "GOD FACTOR (Y/N):";
1120 FOR X=1 TO 500
1130 A$=INKEY$:IF A$="Y" OR A$="y" THEN MAN=1
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```
1140 NEXT
1150 IF MAN<>1 THEN RETURN
1160 PRINT @ (23,1), CLEARLINE$;
1169 '*BL=begin life, SHC=start/stop hardcopy, SL=stop life, CD=change developement, CS=change
 star stability, PR=print report, PC=PLANET CHECK
1170 PRINT @ (23,1), "ENTER CODE # 1:BL 2:SHC 3:SL 4:CD 5:CS 6:PR 7:PC";
1180 A$=INKEY$:IF A$="" THEN 1180
1190 A=VAL(A$):ON A GOTO 1210,1230,1240,1250,1500,1550,1700
1200 PRINT @ (23,1), CLEARLINE$;:PRINT @ (23,1), "INVALID.....";:FOR X=1 TO 1500:NEXT:GOTO 1160
1209 '*** BEGIN LIFE ON PLANET ***
1210 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"WHICH PLANET:";:GOSUB 1260:FLAG=0:GOSUB 1760:IF
 FLAG=-1 THEN PRINT@(23,1),"STAR HAS NO PLANETS.";:GOSUB 420:RETURN
1211 TEMP=VAL(GD$):IF PLANET(TEMP,2)=1 THEN PRINT@(23,1),"PLANET ALREADY HAS LIFE";:GOSUB
420:PRINT@(23,1), CLEARLINE$;:TEMP=0:RETURN
1213 PLANET(TEMP,2)=1:STAR$(TEMP)="'*.":PLANET(TEMP,3)=1:MSG$(10)="PLANET: "+GD$+" HAS
 INTELLIGENT LIFE PRODUCED BY HIGHER POWERS.":PRINT@(23,1),
 CLEARLINE$;:STATE=1:STATE2=1:TEMP=0:RETURN
1220 FOR TIMER=1 TO 1500:NEXT:PRINT @ (23,1), CLEARLINE$;:RETURN
1229 '*** START/STOP HARDCOPY ***
1230 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"1=START  2=STOP  PRINTOUTS:";:GOSUB 1260
1233 IF GD$="1" THEN PRT=1:RETURN
1234 IF GD$="2" THEN PRT=0 :RETURN
1235 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"INVALID....TRY AGAIN";:GOSUB 420:GOTO 1230
1239 '*** END LIFE ON PLANET ***
1240 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"WHICH PLANET:";:GOSUB 1260
1242 TEMP=VAL(GD$):IF PLANET(TEMP,2)=0 THEN PRINT@(23,1),"PLANET ALREADY HAS NO
 LIFE...";:GOSUB 420:PRINT@(23,1), CLEARLINE$;:TEMP=0:RETURN
1243 FLAG=0:GOSUB 1750:IF FLAG=-1 THEN PLANET(TEMP,3)=PLANET(TEMP,3)-RND(4):RETURN
1244 PLANET(TEMP,2)=0:PLANET(TEMP,3)=0:PLANET(TEMP,4)=0:PRINT@(23,1),
 CLEARLINE$;:MSG$(10)="LIFE ON PLANET "+GD$+" HAS BEEN SNUFFED OUT BY HIGHER
 POWERS.":STATE2=1:STAR$(TEMP)="'*":STATE=1:TEMP=0:RETURN
1249 '*** CHANGE DEVELOPMENT STAGE ***
1250 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"WHICH PLANET:";:GOSUB 1260:TEMP=VAL(GD$)
1252 PRINT@(23,1), PLANET(TEMP,3);" ENTER DEVELOPMENT STAGE CHANGE +/-:";:GOSUB 1265
1254 IF PLANET(TEMP,3)+VAL(GD$)<0 OR PLANET(TEMP,3)+VAL(GD$)>15  THEN
 PRINT@(23,1),"INVALID...................";:GOSUB 420:GOTO 1252
1255 PLANET(TEMP,3)=PLANET(TEMP,3)+VAL(GD$):MSG$(10)="PLANET "+STR$(TEMP)+"'S DEV. LEVEL
 CHANGED TO
 "+DEVELOPMENT$(PLANET(TEMP,3)):STAR$(TEMP)="'*.":STATE=1:STATE2=1:TEMP=0:PRINT@(23,1),
 CLEARLINE$;:RETURN
1259 '*** INPUT COLLECTING ROUTINES ***
1260 GD$=INKEY$:IF GD$="" THEN 1260 ELSE RETURN
1265 CNT=2:TMP$="":GD$=""
1266 TMP$=INKEY$:IF TMP$="" THEN 1266
1267 GD$=GD$+TMP$:CNT=CNT-1:IF CNT=0 THEN RETURN ELSE 1266
1299 '*** INTERSTELLAR TRAVEL ROUTINE ***
1300 FOR X=1 TO 7:IF PLANET(X,4)>0 THEN COUNT=COUNT+1
1310 NEXT:IF COUNT=7 THEN RETURN
1320 RNF=RND(10):RNF=RNF+FACTOR(N,1):IF RNF<=10 THEN RETURN
1330 MSG$(5)="STAR : "+STR$(N)+" ATTEMPTS INTERSTELLAR TRAVEL  EPOCH :
 "+STR$(YEAR):TEMP=0:STATE2=1
1340 RNF=RND(4):RNF=RNF+FACTOR(N,1)
1350 IF RNF<5 THEN MSG$(6)="INTERSTELLAR ATTEMPT FAILED...":RETURN
1360 RNF=RND(7):IF RNF=N THEN 1360
1370 IF PLANET(RNF,4)>0 THEN 1360
1380 MSG$(6)="STAR : "+STR$(N)+" HAS REACHED STAR : "+STR$(RNF):TEMP=RNF
```

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1390 IF PLANET(TEMP,2)=1 THEN 1410 ELSE IF PLANET(TEMP,0)=1 THEN
 PLANET(TEMP,4)=1:MSG$(7)="PLANET : "+STR$(TEMP)+" UNINHABITED AND COLONIZED BY STAR :
"+STR$(N):TEMP=0
1400 RETURN
1410 RNF=RND(7)+FACTOR(TEMP,1)-FACTOR(N,1):IF RNF>5 THEN MSG$(7)="PLANET :
"+STR$(TEMP)+" IS INHABITED AND STAR : "+STR$(N)+" MAKES NO CONTACT.":TEMP=0:RETURN
1420 IF RNF<4 THEN MSG$(7)="PLANET :"+STR$(TEMP)+" IS INHABITED & CONQUERED BY STAR
:"+STR$(N):PLANET(TEMP,4)=1:TEMP=0:RETURN
1430 IF RNF=4 OR RNF=5 THEN MSG$(7)="PLANET :"+STR$(TEMP)+" IS INHABITED & CONTACT IS
 MADE BY STAR :"+STR$(N):PLANET(TEMP,4)=2:TEMP=0:RETURN
1440 TEMP=0:RETURN
1499 ' *** CHANGE STAR STABILITY ***
1500 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"WHICH STAR: ";:GOSUB 1260
1510 TEMP=VAL(GD$):IF TEMP<1 OR TEMP>7 THEN PRINT@(23,1),"INVALID.......";:GOSUB 420:GOTO
 1500
1520 PRINT@(23,1),"CHANGE IN STABILITY FACTOR +/-: ";:GOSUB
 1265:STAR(TEMP,3)=STAR(TEMP,3)+(VAL(GD$))
1530 RETURN
1549 ' *** PRINT REPORT ***
1550 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1),"PRINTING REPORT....";
1560 LPRINT "****  REPORT OF STATUS IN EPOCH "+STR$(YEAR)+"  ****":LPRINT
 STRING$(70,"-"):LPRINT "STARS:"
1570 LPRINT:LPRINT "AGE","# PLANETS","LIFE FACTOR","STABILITY FACTOR":LPRINT
 "---","---------","-----------","----------------"
1580 FOR X=1 TO 7:LPRINT STAR(X,0),STAR(X,1),STAR(X,2),STAR(X,3):NEXT:LPRINT:LPRINT
 STRING$(70,"-"):LPRINT "PLANETS:"
1590 LPRINT "INHABIT","LIFE PROB","INTELL LIFE","DEV STAGE","CONQ"
1595 LPRINT "-------","---------","-----------","---------","----"
1600 FOR X=1 TO 7:LPRINT PLANET(X,0),PLANET(X,1),PLANET(X,2),PLANET(X,3),PLANET(X,4):NEXT
1610 LPRINT STRING$(70,"-"):LPRINT "FACTORS":LPRINT "INTEL PROB","AGRESS
 FACT","DIS.FACTOR","DEV VAR":LPRINT "----------","-----------","----------","-------"
1620 FOR X=1 TO 7:LPRINT FACTOR(X,0),FACTOR(X,1),FACTOR(X,2),FACTOR(X,3):NEXT
1630 RETURN
1699 ' *** PRINT PLANET REPORT ***
1700 PRINT@(23,1), CLEARLINE$;:PRINT@(23,1), "PRINTING PLANET REPORT......";
1710 LPRINT "**** P L A N E T   R E P O R T ****":LPRINT "       -------------------------":LPRINT
1720 FOR X=1 TO 7:LPRINT "PLANET :";X;"   DEVELOPMENT LEVEL=
";DEVELOPMENT$(PLANET(X,3)):NEXT
1730 RETURN
1749 '*** SURVIVAL ROUTINE ***
1750 RNF=RND(4):IF (RNF+FACTOR(TEMP,1))>6 THEN FLAG=-1:MSG$(10)="THERE ARE
 SURVIVORS....HIGHER POWERS HAVE NOT CRUSHED LIFE ENTIRELY."
1755 STATE=1:STATE2=1:RETURN
1759 '*** DOES STAR HAVE PLANETS ***
1760 IF STAR(VAL(GD$),1)<1 THEN FLAG=-1
1761 RETURN
9999 END
10000 SAVE "STARS4H/BAS:1"
10001 END
```

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SuperSCRIPSIT for the Model III
SuperSCRIPSIT for the Model 4
Scripsit PRO for the Model 4

Font style	Point Size (Height of Letter)
Century	10 point
Amertype	10 point
Legal	10 point
Helvetica	10 point
Optimas	10 point
Palitine	10 point
Times Roman	10 point
Palitine	12 point
Centrum	12 point
Optimis	12 point
Helvetica	12 point
Palitine	8 point

Each Font Package supports normal, bold and italics printing of letters. Thirty-six soft font packages in all, Twelve soft fonts for each word processor supported.

Prices are $10 for each soft font package, plus (Z)
Discounts for multiple font orders are:
5 Font Packages for $ 45.00 (Z)
10 Font Packages for $ 90.00 (Z)
12 Font Packages for $ 96.00 (Z)

FILE CABINET CATALOGS

MODEL 4 TRS-80 PUBLIC DOMAIN	$ 2.00 (V)
MODEL 4 HIGH RESOLUTION	$ 2.00 (V)
MODEL 4 MACPAINT HIGH RESOLUTION	$ 2.00 (V)
TRS-80 MODEL 1/3 PUBLIC DOMAIN	$ 2.00 (V)
SYMPHONY 90 MUSIC LIBRARY CATALOG	$ 3.00 (V)

SYMPHONY 90 MUSIC SYSTEMS FOR THE MODEL 4

SYMPHONY 90 COMPOSER SYSTEM Specify Model 4 or Model 3 Version	$ 39.95 (Z)
SYMPHONY 90 PLAYER SYSTEM Specify Model 4 or Model 3 Version	$ 17.95 (Z)

SYMPHONY 90 MUSIC INTERFACE UNIT WITH AMPLIFIER
Sold only with Composer or Player program.

Interface and Composer System Specify Model 3 or Model 4 Versions.	$114.00 (Z)
Interface and Player System Specify Model 3 or Model 4 Versions.	$ 92.00 (Z)

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TRSLINK issue 1 to 48 only (5-1/4" LSDOS 6.3 or 5-1/4" TRSDOS 1.3) Complete set 1 to 48 $ 36.00 (Z) (Flippy Disks Only)	$ 1.50 (V)

SPECIALTY PROGRAM

SPECTECH Disk#1 A collection of electronic and other formula programs.	$ 5.00 (V)

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TRSDOS 1.3 R/S Cat # 26-0312 Model 3, Disk Operating System and BASIC	$ 7.00 (X)
LDOS 5.3.1 Model 3 Disk Operating System and Basic Interpreter.	$ 39.95 (Z)
LS-DOS 6.3.1 R/S Cat # 700-2297 Model 4 Disk Operating System and Basic Interpreter	$ 39.95 (Z)

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One Wide Labels for Mail or Disks Pressure Sensitive, Quality Guaranteed.

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1000 per package	$ 4.22 (B)
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1000 per package	$ 5.25 (B)
5000 per box	$ 22.95 (B)
More than one 5000 pc. box	$ 20.66 (B)
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1000 per package	$ 7.45 (B)
5000 per box (One Box)	$ 26.95 (B)
More than one 5000 pc. box	$ 24.95 (B)
4 x 1-7/16 Plain Permanent Mailing Labels	
1000 per package	$ 5.25 (B)
5000 per box (One Box)	$ 22.95 (B)
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FLOPPY DISKS 5-1/4 Double/Single Sided Disks DD. 100% Error Free Lifetime Guarantee with Paper Sleeves, Labels & Read/Write Tabs.	$ .40 (C)
FLIPPY DISKS 5-1/4 Single Sided DD on both sides. Premium Quality with two notches by factory. American made by Name brand mfg. 100% Error Free. With Paper Sleeves, Labels & R/write Tabs.	$ .60 (C)
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FLOPPY DISK MAILERS Self-Sealing Mailer package of 10 Holds one or two 5-1/4 floppy disks.	$ 3.35 (Z)

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Printer to Selector Switch 10'	$ 15.95 (E)
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RS232 Serial Cable 6 ft. Equal to Radio Shack #26-240, Male - Female	$ 8.95 (E)
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RS232 NULL MODEM Cable 6 ft Connect two computers together.	$ 9.95 (E)
RS-232 EXTENDER CABLE For computers w/RS-232 connector pointing down on the bottom of the computer.	$ 8.00 (Z)

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HARD DRIVE CABLE 4 ft w/50 pin Edge Card connector & H D pin connector.	$ 16.00 (Z)

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UNIVERSAL PRINTER DUST COVERS For printers up to 16" wide, anti-static vinyl.	$ 9.75 (Z)

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Internal Half Height 5-1/4 360K	$ 67.00 (Z)
Internal Half Height 3-1/2 720K	$ 67.00 (Z)
Half Height Filler Plate	$ 4.00 (V)
Internal 2 Drive Cable Specify: Model 4 Gate Array or Non-Gate Array. Model 4D or 4P. S&H included when ordered with drives.	$ 10.00 (X)
50 Pin Y CABLE Enables hard two units to be connected to the I/O-Bus at the same time.	$ 18.00 (Z)

EXTERNAL HALF HEIGHT DOUBLE SIDED DISK DRIVES COMPLETE WITH CASE AND POWER SUPPLY

One Disk Drive Unit One 5-1/4 360K or One 3-1/2 720K Unit.	$143.00 (S)
Two Disk Drive Unit Two 5-1/4 360K drives, or two 3-1/2 720K drives. Or one 5-1/4 360K and one 3-1/2 720K drive.	193.00 (S)

MEMORY CHIPS for MODEL 4

64K UPGRADE KIT Includes 8 150ns 128 refresh cycle dynamic ram chips, plus instructions and Memory Test Disk.	$ 12.95 (Z)
PAL CHIP Required to upgrade Non-Gate Array Model 4s.	$8.00ea (V)

MICRO-LABS HIGH RESOLUTION BOARDS

GRAFYX SOLUTION for Model 3/4/4P/4D Free Draw Program included. Specify Model when ordering because the boards are different for each Model. Model 3, Model 4P, Model 4 Non-Gate Array or Model 4 Gate Array.	$99.00 (Z)

MISCELLANEOUS HARDWARE

HI-RES BOARD EXTENDER BLOCK Used to raise graphic board when other boards have been installed. Normally not required. Can also be used to raise other 34 pin header, type boards. Specify height: 3/16", 5/16", or 5/8"	$ 5.50 (X)
ROMCLOCK4 - CLOCK CHIP Clock chip with ROMCLOCK4 or ROMCLOCK3 Utility program package and installation instructions. Keep time and date current. 10 year lithium battery.	$ 35.95 (Z)
I/O-BUS CLOCK Realtime clock uses exterior I/O Bus, no internal connections or wiring.	$ 59.00 (Z)
I/O-BUS LD INTERFACE Connect an exterior disk drive unit to your 4P or Model 4/4D, not required for the first two drives on your Model 4/4D.	$180.00 (Z)
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ADD SHIPPING & HANDLING CHARGES LISTED BELOW TO YOUR ORDER

$10 Maximum S&H charge for United Parcel Ground Service. Add the shipping and handling charges per item ordered, if it exceeds $10 for shipment in the 48 states then add only $10 to your order for shipping and handling.

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(B) - Add $4 for ea. label package. $5 for 1 box of labels. $4 per box for more than a one box shipment.
(C) - Add $4.00 per order of 5-1/4". floppy or flippy disks.
(D) - Add $4.00 per order of 3-1/2" disks.
(E) - Add $4 for one or more cables.
(S) - Add $6 Shipping & Handling
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(U) - Add .50 cents per package.
(V) - Shipping & Handling Included.
(W) - Add $1 Shipping & Handling.
(X) - Add $2 Shipping & Handling.
(Y) - Add $3 Shipping & Handling.
(Z) - Add $4 Shipping & Handling.

Shipments are made by UPS ground service whenever possible. Please use street address and include phone number when ordering. Consistent with industry standards no refunds are made for opened software, manuals, intergrated circuit chips or computer parts. Replacement limited to defective material only. No returns without written authorization.

Check or Money Order Payment Only - We do not accept Credit Card orders. C.O.D. add an additional $4.50 per order. APO, FPO, HI, AK, PR, and Canada add an additional $2 per order unless otherwise stated. Wyoming Residents Only add 4% Sales Tax. Prices subject to change without notice.

Order from: Computer News 80, PO Box 680, Casper, WY 82602-0680; (307)265-6483
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TOP QUALITY PRINTER RIBBONS

Printer	Radio Shack Cat. Number	CN80 Number	Type	Price Each for	
				One	6 or More
LP I, II, IV	26-1413	CN1001	FABRIC REFILL	5.55	5.05
LP III, V	26-1414	CN1002	FABRIC CART.	6.38	5.88
LP III, V	26-1414	CN1003	FABRIC REFILL	4.79	4.29
LP VI/VIII,DMP 400/420	26-1418	CN1004	FABRIC CART.	5.60	5.10
LP VII, DMP 100	26-1424	CN1038	FABRIC CART.	6.00	4.50
DMP 110	26-1283	CN1005	FABRIC CART.	6.58	6.08
DMP130/130A/132/133/107	26-1236	CN1006	FABRIC CART.	6.40	5.90
DMP130/130A/132/133/107	26-1238	CN1007	FABRIC REFILL	5.00	4.50
DMP 500	26-1482	CN1008	FABRIC CART.	13.40	12.90
DMP 120, 200	26-1483	CN1009	FABRIC CART.	7.00	6.50
DMP 120, 200	26-1489	CN1010	FABRIC REFILL	4.85	4.35
DMP 430	26-1296	CN1013	FABRIC CART.	12.25	11.75
DMP 440	26-2809	CN1014	FABRIC CART.	19.30	18.80
DMP 2100, 2100P, 2110	26-1442	CN1015	FABRIC CART.	6.10	5.60
DMP 2100, 2100P, 2110	26-1442	CN1016	FABRIC REFILL	4.85	4.35
DMP 2120	26-2834	CN1017	FABRIC CART.	13.05	13.05
DMP 2120	26-2836	CN1018	FABRIC REFILL	7.90	7.40
LMP 2150	26-1287	CN1019	FABRIC CART.	8.00	7.50
DWP II, DWP 410/510	26-1419	CN1020	MULTI-STRIKE CT.	5.35	4.85
DWP II, DWP 410/510	26-1419	CN1021	M-S REFILL	4.50	4.00
DWP II, DWP 410/510	26-1449	CN1022	FABRIC CART.	6.55	5.95
DWP II, DWP 410/510	26-1449	CN1023	FABRIC REFILL	5.45	4.95
DWP 520, 230, 210	26-1445	CN1024	MULTI-STRIKE CT.	5.15	4.65
DWP 520, 230, 210	26-1445	CN1025	M-S REFILL	4.50	4.00
DWP 520, 230, 210	26-1458	CN1026	FABRIC CART.	5.60	5.10
DWP 520, 230, 210	26-1458	CN1027	FABRIC REFILL	4.80	4.30
DWP 220	26-1299	CN1028	MULTI-STRIKE CT.	7.95	7.45
DWP 220	26-1299	CN1029	M-S REFILL	3.60	3.10
DMP 300/2102	26-2819	CN1030	FABRIC CART.	7.15	6.65
DMP 300/2102	26-2819	CN1031	LONG LIFE CART.	6.85	6.35
ALPS ASP-1000	900-2326	CN1032	FABRIC CART.	6.60	6.10
EPSON FX/MX/RX-80	900-2327	CN1033	FABRIC CART.	5.50	5.00
EPSON LX/80/90	900-2328	CN1034	FABRIC CART.	5.00	4.50
PANASONIC KXP1090	900-2331	CN1035	FABRIC CART.	6.10	5.60
PANASONIC KXP1090	900-2331	CN1036	LONG LIFE CART.	7.35	6.85
STAR MICRON. NX1000	900-2332	CN1037	FABRIC CART.	6.45	5.95
PANASONIC KXP1180/1190/1191		CN1039	FABRIC CART.	6.90	6.40
PANASONIC KXP1180/1190/1191		CN1040	LONG LIFE CART.	7.60	7.10
SEIKOSHA SP-2000		CN1041	FABRIC CART.	6.40	5.90
DMP 500		CN1043	FABRIC REFILL	5.30	4.80
DMP 430		CN1044	FABRIC REFILL	5.60	5.10
ALPS ALLEGRO 24		CN1045	FABRIC CART.	7.25	6.75

ALL RIBBONS ARE BLACK, CART.= Plastic Cartridge, REFILL= Refills Only/No Cartridge.

Add for Shipping and Handling

1 to five items add (Y) .... 6 or more items add (Z)
Please refer to the CN80 Product Guide Shipping and Handling Schedule.

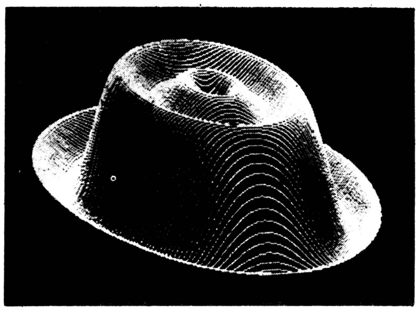
Some ribbons for the older Radio Shack printers are not stocked, but are still available by special order, please allow an additional week shipping time. All stock ribbons are shipped within 24 hours from the time the order is received. C.O.D orders accepted. Government and educational institution purchase orders are accepted. Sorry, we do not accept credit card orders.

Grafyx Solution™

HIGH RESOLUTION BOARD FOR MODEL 3/4/4P/4D
Distributed by Computer News 80

Free Draw Program
Included

Hi-Resolution Graphics for Mod 4/4D/4P/III



Superior Hardware. The Grafyx Solution provides 153,600 pixel elements which are arranged in a 640 × 240 or on the Model III a 512 × 192 matrix. Hundreds of new business, personal, engineering, and educational applications are now possible. The hi-res display can be shown on top of the standard display containing text, special characters, and block graphics. This simplifies program debugging, text labeling, and upgrading current programs to use graphics. The Grafyx Solution fits completely within any tape or disk based Model 4, 4D, 4P, or III. Installation is easy with the plug-in, clip-on Grafyx Solution board.

Superior Basic. Over 20 commands are added to the Basic language. These commands will set, clear or complement points, lines, boxes, circles, ellipses, or arcs. The hi-res screen can be printed on any of 30 popular printers or saved or loaded to disk without leaving Basic. Areas may be filled in with any of 256 patterns. Sections of the screen may be saved and then put back using any of five logical functions. Labels can be printed in any direction. The viewing area can be changed. The entire screen can be complemented or cleared. Graphics Basic provides dot densities of 640 × 240, 320 × 240, 160 × 240, and 160 × 120, all of which can be used in the same display.

Superior Software. The board comes with over 40 programs and files which make it easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software works with TRSDOS 1.3, 6.1.2, 6.2, 6.3; Dosplus 3.4, 3.5, 4; LDOS; and Newdos80. The Grafyx Solution is also supported by 30 optional applications programs: Draw, Bizgraph, xT.CAD, 3D-Plot, Slideshow, Mathplot, Surface Plot, Chess, etc.

Purchase a Grafyx Solution Hi-Res Graphics Board for $ 99.00 and receive a free copy of DRAW a powerful graphics program which allows drawing or designs to be easily created on a Model III/4/4P/4D.

$ 99.00 Add (Z) S&H

Specify Model 3, Model 4p, Model 4 Gate Array, or Model 4 Non Gate Array when ordering. The boards are different for each. Please include phone number.

SAVE WITH OUR HIGH RESOLUTION
COMBINATION PACKAGE
NUMBER ONE

- MicroLabs Grayfyx Solution Board
- MicroLabs Draw Program
- PostMaster Program
- Hi-Res Utilities Program
- PostMaster Support Utilities
- Five HiRes File Cabinet Volumes

A $210.50 value if purchased seperately.

All for the Super CN80 low price of

$166.95

Add (Z) S&H

SUPER SAVER

ALREADY HAVE YOUR HIGH RESOLUTION
BOARD INSTALLED - THEN

SAVE WITH OUR HIGH RESOLUTION
COMBINATION PACKAGE
NUMBER TWO

- PostMaster Program
- Hi-Res Utilities Program
- PostMaster Support Utilities
- Five HiRes File Cabinet Volumes

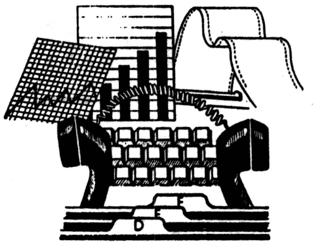
A $111.50 value if purchased seperately.

All for the Super CN80 low price of

$ 75.95

Add (Z) S&H

SUPER SAVER



ANSITERM 4

by Richard VanHouten

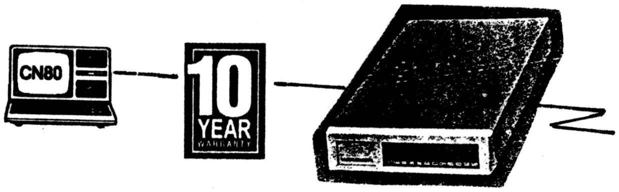
TRS-80 Model 4 High Resolution Communications Program.

Supports ANSI (American National Standards Institute) and AVATAR control codes. IBM graphics and file transfer by X-modem or Y-modem.

System requires Model 4 with Modem and High Resolution Board.

Program complete with printed manual.

$ 30.00 (Y) S&H   Order from CN80



2400 Baud External Modem

from Computer News 80

$ 78

Plus $4 S &H

2400 baud transmission speed
Hayes compatible
Compatible with Model 3/4/4D/4P
Compatible with IBM PC/XT/AT
Auto dial/answer
Eight status indicator lights
Built-in speaker with volume control
Second jack for local phone
Call progress and error detection
Ten year manufacturer's warranty
Manufactured in the USA

Complete with all cables and

TRS-80 Communication Software

CONNECTORS

DESCRIPTION	PRICE
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50 Pin 25x2 Edge Card/Female	1.75
50 Pin 25X2 Header Female/Socket	1.25
50 Pin 25x2 Header Male/Plug w/mounting	8.50
50 Pin 25x2 Header Male/Plug no mounting	8.50
36 Contact Centronics Male (Printers)	4.00
34 Pin 17x2 Header Female/Socket	1.95
34 Pin 17x2 Edge Card/Female	1.35
34 Pin 17x2 Header Male/Plug No Mounting	7.50
34 Pin 17x2 Header Male/Plug W/Mounting	7.50
25 Pin DB25 (RS232) Male/Plug	3.00
25 Pin DB25 (RS232) Female/Socket	3.00
PC BOARD MOUNT	
34 Pin 17x2 Box Header - Straight Solder	2.50
50 Pin 25x2 Box Header - Straight Solder	4.50

CONNECTOR S&H
Add $ 2.00 Shipping and Handling if ordered alone.
Shipping and Handling included if ordered with other items.

EXTENSION BLOCKS AND FLAT CABLE

DESCRIPTION	PRICE
EXTENSION CONTACT BLOCKS	
34 Pin 17x2 PCB Socket - 3/16" High	5.50
34 Pin 17x2 PCB Socket - 5/16" High	5.50
34 Pin 17x2 PCB Socket - 5/8" High	5.50

EXTENSION S&H
Add $ 2.00 Shipping and Handling if ordered alone.
Shipping and Handling included if ordered with other items.

FLAT RIBBON CABLE	
25 Conductor	.38 per ft.
34 Conductor	.51 per ft.
50 Conductor	.75 per ft.

CABLE S&H
Add $ 3.00 Shipping and Handling if ordered alone.
Shipping and Handling included if ordered with other items.

CUSTOM CABLES BUILT UPON REQUEST
Call for price quotes.

Sixteen Model 4 Programs!

Mark Reed's Model 4 Utility Disk now contains 16 useful utilities for every Model 4 owner:

- **CLOSE**, to close all open files on a disk;
- **CMDEDIT**, to provide command line editing and recall at "DOS Ready";
- **CMDINST**, to install CMDEDIT on the system disk in drive zero;
- **CMDSTORE**, to install CMDEDIT's special high memory storage area;
- **DSP**, to display control codes and graphics characters;
- **MAPMEM**, to list all low and high memory modules;
- **MOVE**, to transfer files from one drive to another;
- **PRINT**, to format and print text files;
- **PRT**, to print control codes and graphics characters;
- **RECLAIM**, to remove unused high memory modules;
- **SETMOD**, to set or reset files' MOD flags;
- **SETVIS**, to make files visible or invisible;
- **SWAP**, to exchange disk drive numbers;
- **UNFILTER**, to remove a filter from a device without resetting the device;
- **VLOAD**, to display specially formatted disk files; and
- **VSAVE**, to save the display to a specially formatted disk file.

The Utility Disk comes with a help file, a 23-page manual, and full support from the author. Order your copy today for only $14.95 (plus shipping and handling) from *Computer News 80*, P.O. Box 680, Casper, WY 82602-0680.

Introducing

ED-IT for the Model 4

by Mark Allen Reed

For TRSDOS 6.2 or LS-DOS 6.3. ED-IT is a brand new full-screen text editor that combines power, versatility, and ease of use. Its features include fast operation, a large text buffer (nearly 47K with no high memory modules installed), an easy-to-use menu system (activated by the <BREAK> key), three special programming modes (for assembly language, BASIC, and C), word-wrap capability, block operations (including delete, copy, move, save, and load), search operations (including find, change, change to the end of the file, repeat last find or change, and jump to specific line number), and the ability to enter any ASCII character into the document. ED-IT also allows you to execute nearly any DOS command without leaving the editor or affecting the text buffer. You can view a disk directory, purge unwanted files, even FORMAT and BACKUP from within ED-IT!

ED-IT is powerful enough for a programmer, yet simple enough for the casual user. It is excellent for editing README files, patch listings, and job control language (JCL) files. ED-IT comes with a complete instruction manual and full support from the author. Order your copy today for only $17.95 (plus shipping and handling) from *Computer News 80*, P.O. Box 680, Casper, WY 82602-0680.

GREAT SAVINGS ON USED TANDY COMPUTERS & PARTS!

Computers:		
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Model 4P, 2DR		$145
Model 4D, 2DR		$295
Tandy 6000 HD		$595
Tandy 1000 RLX HD 40 meg		$345
Tandy 1000 EX/HX		$99
Tandy 1000 1DR, no Keybd		$59
Tandy 1000 SL		$225
Tandy 1000 TL3		$345
Tandy 2000, 2DR		$99
CM-5		$85
CM-II		$135
Tandy Fax 1020		$195
Tandy 1400 LT Laptop		$395
Tandy 1400 HD Laptop		$595
Tandy 1500 HD Laptop		$629
Tandy 1800 HD Laptop		$695
Tandy 1110 HD Laptop		$595
Printers & Hand Drives:		
Tandy 5 Meg HD		$145
Tandy 12 Meg HD		$195
Tandy 15 Meg HD		$245
DMP 105		$65
DMP 120		$76
DMP 200		$76
DMP 420		$115
DMP 2100P		$295
DMP 210, 410	$95	$145
FP 215 Plotter		$95

USED TANDY BOUGHT & SOLD! WE STOCK MANY MORE COMPUTERS.
PLEASE CALL FOR A LISTING

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PRINTERS FROM CN80 WITH PROVEN COMPATIBILITY

SEIKOSHA SP-2400
9 Pin Printer

80 Column Printer
300 Characters Per Second
IBM and Epson Compatible
Standard Parallel Interface
Built-In Push Tractor & Friction Feed
Easy Front Panel Controls
Paper Parking
Graphics
Two year Manufacturer's Warranty

$ 179

SEIKOSHA SL-90 PLUS
24 Pin Printer

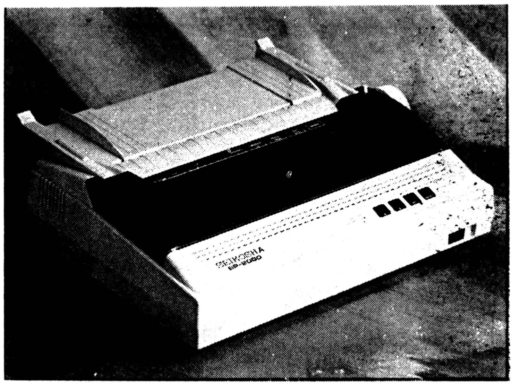
80 Column Printer
240 CPS draft / 80 CPS LQ
IBM and Epson Compatible
Standard Parallel Interface
Built-In Push Tractor & Friction Feed
Easy Front Panel Controls
Paper Parking
Graphics 360 Resolution
Two year Manufacturer's Warranty

$ 279

Add $ 6.00 S&H, Shipped by UPS only.

Fully supported by CN80 and completely compatible with PostMaster, Rembrandt, Long and Loud and all the programs, published by CN80. Will work with any Model III/4,4P or 4D computer.

SP2400 Ribbons
CN1041 $6.40 ea. $5.90 six or more.
SL-90 Ribbons
CN1046 $7.25 ea. $6.75 six or more.



SEIKOSHA
A SEIKO GROUP COMPANY

PostMaster

Computer News 80

PostMaster by David P. Miller is a program that lets you create Posters, Letterheads and Mailing Labels with icons, borders, and many different character fonts using your dot matrix printer. The program runs on TRS-80 Model 4/4P/4D, with 64K or 128K of memory that has a MicroLabs or Radio Shack high resolution board installed.

This program has received the highest praise from reviewers of any program ever written for the Model 4. It allows you to use thousands of icons, borders, and fonts that are available from the File Cabinet Icon Library, it also allows you to add your own icons, borders and fonts.

Printers supported: Radio Shack DMP-130, -130A, -131, -132, -133, -430, -2100P, also any Radio Shack DMP printer with a 3-digit number with "3" as the second digit. All Epson and IBM printers. All other dot matrix printers that are Epson and IBM emulation printers. Seikosha SP-2000, -2000Plus, -2400. Okidata Microline 182 and 192. Panasonic KX-P1091, -1092, -1124, nonsuffixed. Star 10X, -15X, -NP, -NX, LC-10. C-ITOH 1510, 8510, C-130. (Note - Dot Matrix printers providing 300-dpi or 180-dpi may not work with PostMaster and no guarantees can be made concerning them.

Printers that are not supported are: Radio Shack DMP-110, -120, -400, -500, -2100. Panasonic suffixed printers 1124i, 1124e, etc. Okidata 82, 92, and Daisy wheel printers.

Order from Computer News 80.................$40................add S&H (Z)

GIF GRAPHICS FOR YOUR MODEL 4

by J. F. R. "Frank" Slinkman

Send GIF (Graphics Interface Format) high resolution graphics to and receive high resolution graphics from computers of different types with your Model 4 and GIF4MOD4 program.

A high resolution board is highly recommended, but not required. If you have a high resolution graphics board GIFMOD$ will decode any GIF image up to 640 pixels x 480 pixels x 256 colors and put the image on your screen. If you do not have a hi-res board installed the program will convert the GIF format to a /HR format. Then with a High Resolution utilities packager available fro CN80 you can send the /HR picture to your printer.

This package also allows you to send GIF files.

#37.95 + (Z) S&H

I/O-BUS LD INTERFACE

for EXTERNAL FLOPPY DISK DRIVES

Add external floppy disk drives to your Model 4P - no internal wiring - plug the interface into the external 50 pin I/O connector on your 4P and plug your external disk drives into it.

Add additional floppy disk drives to your Model 4 or 4D - again just plug the interface into the 50 pin I/O bus connector and add floppy disk drive 4 & 5.

Software for TRSDOS 6.2.x and LS-DOS 6.3.x and cable included.

Controls Double-Sided 5.25 360K, 3.5 720K or Single-Sided 180K drives.

$ 180 + $4 S&H

= =

Software for LDOS 5.3.x $ 29.94 + S&H additional. For use with the Model 4 in the III mode.

ACCURATE

SIMULATION OF A

1930'S MILLS
SLOT
MACHINE

by J. F. R "Frank" Slinkman

Want to see a real rendition of a working slot machine on your Model 4 computer screen? Then SLOT4 is the one that will do it. True revolving dials for payoff, moving handle, with coin dropping sound.

Amuse yourself and your kids for hours on end. Entertain your guests at your next party with your computer by letting them play SLOT4.

Model 4 with High Resolution Board Required

$14.95 + (Y) S&H

Order from Computer News 80

ACCURATE

SIMULATION OF A

VIDEO POKER

MACHINE

by J. F. R "Frank" Slinkman

Play real poker on your computer with remarkable screen renditions of the playing cards. Optimum video poker strategy can be used on VIDPOKR4 or to play the real thing in Atlantic City or Nevada.

Any Poker fan will really enjoy playing against the computer, or practice the winning strategy that is included with this game package.

Model 4 with 128K and High Resolution Board Required

$19.95 (Y) S&H

Order from Computer News 80

I/O-BUS CLOCK

External Clock

$59.00
Plus S&H

Automatically install current date and time on boot up.

No soldering, no wiring, you do not have to open your computer.

Just plug the I/O-BUS CLOCK unit on the 50 pin I/O bus connector of the Model 4/4P/4D. Compatible with using a hard drive by using a 50 pin Y cable.

Unit is shipped with program for either Model 4 TRS/LS-DOS or Model 3 DOS LSDOS 5.x.x or TRSDOS 1.3.

Please specify Model 4 or Model 3 when ordering.

Disk Operating Systems

TRSDOS 1.3 disk only no manual	$ 7.00
LS-DOS 6.3.1 Upgrade disk with mini manual.	$ 39.95
LDOS 5.3.1 Upgrade disk with mini manual.	$ 39.95

Operating System and Manual.

TRSDOS 6.2.1 New original TRSDOS manuals and system disks.	$ 45.00

TRS-DOS 6.x Manuals Only

Model 4 Disk Owners Manual	$ 20.00

(Used copies no operating system disks)

Plus S&H

ROM CLOCK

Internal Clock

$ 35.95
Plus S&H

ROMCLOCK Clock Chip
AND ROMCLOCK4 or 3 PROGRAM
from Computer News 80

The clock chip will install in any Model 4 or 3 computer. It provides keeping time for year, month, date, hour, minute, and seconds. Plug it in and never have to type the time and date again. It has a lithium power cell that lasts over 10 years. Complete with installation instructions and support.

ROMCLOCK4 OR ROMCLOCK3
UTILITY PROGRAM PACKAGE
by David Goben

The new clock operating program that works on SmartWatch, No-slot Clock and the CN80 ROMCLOCK. Simpler to operate and takes less memory than previous SmartWatch programs.
Complete program and manual.
$ 5.00 each add S&H

MINE FIELD

EXCITING AND NEW GAME FOR THE TRS-80 MODEL 4.

by Richard VanHouten

Cross the mine field and flag all the mines in advance of your troops without going boom yourself.

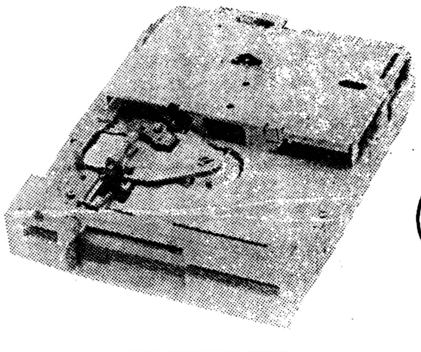
Five degrees of difficulty, the more mines you flag the higher your score.

Fully serial mouse supported, but a mouse is not required.

$ 12 plus S&H

CHINON 5.25" Floppy Disk Drive

Low Power Consumption Plus High Performance



CUSTOM IC design in the read/write and control circuits gives maximum performance and low power consumption. A pop-up mechanism protects against mischucking upon disk insertion, allowing disks to be loaded/unloaded with ease. **Chinon 5.25" floppy disk drives** provide high speed access (3 ms).

DOUBLE SIDED HAlf HEIGHT DRIVES
Install in any Model 3/4/4P/4D

CHINON 3.5" Micro Floppy

High Storage Capacity

5-1/4" SPECIFICATIONS

360K Capacity
40 cyl. (track)

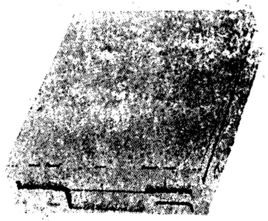
$67 each 5-1/4 or 3-1/2
Complete with installation instructions and CN80's support. Add $4 S & H per order in US.

Compatible with all
Model I, III, 4/4P/4D Computers
and All their operating systems.

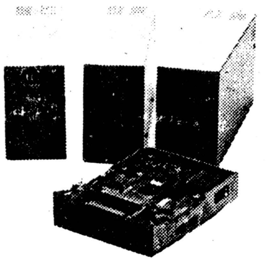
TWO DRIVE INTERNAL DRIVE CABLE
$10 add $2.00 S&H in US. S&H included when ordered with drives.

3-1/2" SPECIFICATIONS

720K Capacity
80 cyl. (track)



- One Year Manufacturer's Warranty



EXTERNAL DISK DRIVES

From

Computer News 80

These external disk drives come in a metal case with power supply, power cord, and 4 ft. drive cable which plugs into the external disk drive connector on your computer. External disk drives are shipped complete via UPS ready for you to use, just plug them in and run. Plus you get our full support and two year warranty.

Add convenience and 720K storage space
with 3-1/2 disk drives to your system.
Complete with all cables ready to go
at one low price.
FULL TWO YEAR WARRANTY
On all parts and labor.

ALL DISK DRIVES ARE HALF HEIGHT DOUBLE-SIDED DRIVES

One disk drive unit........................$ 143.00
with one 5-1/4 360K
or 3-1/2 720K unit.

Two disk drive unit........................$ 193.00
with two 5-1/4 360K drives
or two 3-1/2 720K drives
or one 5-1/4 and one 3-1/2 drives.

Add $ 6.00 Shipping and Handling in the US only, all others contact us for shipping costs.

CHECK OR MONEY ORDER, NO CREDIT CARDS

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REPAIR AND UPGRADE SERVICE
FOR MODELS III, 4, 4P AND 4D

- UPGRADE INSTALLATIONS
- MEMORY EXPANSION TO 128K
- HIGH RESOLUTION BOARDS
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- DOUBLE SIDED DISK DRIVES
- OTHER UPGRADES AVAILABLEO

We give you a firm quotation on all work to be done prior to doing the work. If you do not approve your computer is returned to you. A small diagnostic fee and return shipping costs will be charged.

You supply your own shipping carton and ship the computer to us for repair, via United Parcel Service. Please remember to insure your shipment. Return packaging and shipping costs will be included in our quotation for any repairs or installation charges.

For more details call
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Our shipping address is:
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Casper, WY 82609

RESTORATION SERVICE

If you have an original application program disk that needs to be restored, send it and $5.00 to cover the postage and handling. Please remember that it must be an original, legally owned by you, master disk. We will not restore copies of original program disks. There are many commercial games and other programs that we will not have in the archives, so it is best to call first and check.

FILE TRANSFER SERVICE

If you want to have your files transferred from one media to another. Such as having your files transferred from 5-1/4 disks to 3-1/2 we can do that for you. If you want to have files transferred from an IBM (MS-DOS) format to a TRSDOS/LS-DOS format, or from TRS-80 to IBM (MS-DOS) we can provide that service. However we do not have the equipment to handle 8" disks. Call or write for further details concerning the transfer service.

CP/M

Now only $140. Pickles & Trout CP/M-2.2m for your Radio Shack TRS-80 Model-II, -12, -16, or -6000 computer.

Still running "less-than-the-best?" We can upgrade your existing CP/M software (Lifeboat, P&T, ATON, Whatever) to the latest Pickles & Trout CP/M-2.2mH release, only $65. [Includes new manuals, full screen editor, full utilities, double sided disk support, and more.]

RAMD — Let your P&T CP/M use the 68000, memory as a super-speed disk drive, only $49.

REFORMATTER — Your TRSDOS system can read/write CP/M diskettes, only $49.

Looking for a CP/M program? WordStar, dBASE? Give us a call.

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MOUSEDOS

by Leonard Lorden

Load MOUSEDOS (Mouse Plus by David Goben is required) and select an icon from the screen display. Disk Drive Icon, displays a new menu and mini-keyboard. Write your command line. Utility Icon, displays several DOS commands and utility icons, click the mouse on the desired command icon or click the Exit icon to return to the main menu.

Included are icons for AUTO, BACKUP, BOOT, CONV, COPY, FILTER, FORMAT, FORMS, LINK, LIST, REMOVE, RENAME, RESET, ROUTE, SET, SETKI, SPOOL, SYSTEM, VERIFY.

Fancy in appearance, easy to understand and use. A must for mouse users. $ 25 plus S&H

Programs by David Goben

Available *only* from *Computer News 80*

David's Model 4 File Utilities: for TRSDOS/LS-DOS 6.x.

for TRSDOS/LS-DOS 6.x. Nine great file handling utilities to ensure the reliability of your files and save you *hours* of work. Of them: **DSPTXT** will allow you to view ASCII files in forward and reverse, featuring automatic word wrap, tab expansion, printed form setup, and embedded graphics. **INDEX4** will list a disk's visible files in alphabetical order, and allows you to add comments to describe them. **ERASE** totally removes all traces of a file from a disk – ensure data security. **UNREMOVE** will recover removed, killed, and purged files. Will also list all the removed files on a disk. **SAVBAS** allows you to recover a BASIC program stored in memory after you leave BASIC (and forgot to save it). *Many other utilities.* **$9 + S&H.**

David's Model III LDOS File Utilities:

for LDOS 5.x. Has the same programs as those described above, except for **SAVBAS** (not needed). Contains 8 programs. **$9 + S&H.**

David's Model 4 System Utilities:

for TRSDOS/LS-DOS 6.x. 16 powerful programs to streamline your system maintenance. Featured: **XMEMDISK** is the most powerful MemDISK utility going. Maintain more than one MemDISK! **XDRIVE** will allow you to make one disk drive act like 2. **ONEPASS** is the most powerful single-pass disk duplicator ever. Even more powerful than QFB and DISKCOPY. **VERDISK** will verify the integrity of your disks. **PRINT** allows you control any printer from the DOS command prompt. *Plus many other useful utilities.* **$16 + S&H.**

David's Model III LDOS System Utilities:

for LDOS 5.x. 14 powerful programs to streamline your system maintenance. Includes all programs described above, less **XMEMDISK**. Includes **VIDX** to greatly enhance your screen and character control. **$16 + S&H.**

T62DOSXT:

For TRSDOS 6.2.x. Still use TRSDOS 6.2 but want to re-enable the dating? T62DOSXT will patch your system to take TRSDOS 6.2 through the end of 1999. Something that LSI, the DOS's creator said was impossible. ***FULL*** compatibility with the date format of LS-DOS 6.3. Includes numerous optional system enhancement patches. Also features **DATECONV** to upgrade disks to the new format. **ONEPASS** for disk duplication. Plus more! Unlike other patches, this package is *safe* with older disks that have not been converted. Use **T62DOSXT** with *complete* confidence. **$18 + S&H.**

PACK:

For TRS-80 or MS-DOS. Pack, unpack, compress, or superpack your BASIC programs for faster operation and more efficient use of disk space. The TRS version contains both Model I/III and 4 versions. MS-DOS version requires DOS version 2 or higher. Please specify computer system when ordering. **$17.95 + S&H.**

DEA: *The Disk Editor/Assembler.*

The most powerful integrated editor/assembler ever written. Contains both Model I/III and 4 versions. Has more enhanced features than any other. Conditional assembly, long label names, and abundant powerful math functions that are lacking in other packages. Reference addresses in, or include code from other disk files while assembling programs. These are only a small part of its many powerful features. The **DEA** package also includes a disassembler, cross reference utilities, and plentiful programming examples. **DEA** was used to write ***EVERY*** program listed in *Computer News 80* by David Goben, including **BCX, MagicDraw, Symphony 90, Diskopt, SCRIPT,** and *all* the others!

DEA: *Making Assembly Language Accessible.* **$49.95 + S&H.**

High Resolution Programs by David Goben

Available *only* from *Computer News 80*

MagicDraw: *Making screen design easy.*

For Model 4/4p/4d with a hi-res board and a serial mouse with mouse driver software. No high resolution Computer-Aided Drawing program has ever been like it. Nothing comes close to the speed, ease of use, and the power offered by **MagicDraw**. ***NONE!*** If you thought drawing on the hi-res screen was too cumbersome or too difficult and that you would have to leave that kind of work to others with more experience, then *think again*. **MagicDraw** is as close to buying hi-res experience as you can get.

MagicDraw offers you *dozens* of features more than its nearest competitor. It also offers you a menu selection system that was said to be totally out of reach of a TRS-80. *Wrong!* Choosing the right tool for the job has never been so easy. No more going to help screens or digging through manuals to remember a tool's selection command; with **MagicDraw** you can do so right from an easy-to-use menu.

MagicDraw: *Realizing dreams.* **$65 + S&H.**

Hi-Res Utilities Package:

for Model 4/4p/4d with a hi-res board. Take control of your hi-res artwork with this group of 10 utilities. These are the fastest hi-res utilities ever written. **HRLOAD** will load a high resolution screen file in a fraction of the time of its nearest competitor. It will load the normal **HR** files, the "crunched" **CHR** files, and super crunched **SHR** files. **HRSAVE** allows you to save hi-res screen in **HR**, **CHR**, and **SHR** format. **HRFXPRT** allows you to dump the hi-res screen to an Epson-compatible printer with an *incredible* variety of resolutions. **HRIBMPRT** dumps to an IBM ProPrinter-compatible printer. **HRLSRPRT** dumps to a LaserJet+ compatible printer or DeskJet printer. Seven sample files included. Other utilities allow you to clear, flip, view and shrink the screen. Take the difficulty out of processing your hi-res screens. **$15 + S&H.**

Postmaster Support Utilities:

For Model 4/4p/4d with a hi-res board and with *POSTMASTER*. Enhance your work with David P. Miller's fantastic ***POSTMASTER*** program with this set of utilities. **MAKEICN** allows you to *capture* a portion of the screen and convert it into a ***POSTMASTER*** icon. 3 capture box sizes allows you to capture larger portions of the screen and shrink them down to icon size, if you wish to. **ADDICN** allows you to add a captured icon to a library file, which ***POSTMASTER*** can use to choose from several icons. **DSPICN** allows you to view the icons you captured. **DSPLIB** displays your ***POSTMASTER*** icon libraries. **DECDFON** and **DECDBOR** allows you to *decode* ***POSTMASTER*** font and border files so that you can edit and customize them using any text editor or word processor that can process ASCII files, such as **SCRIPT** or **EDIT-4** (both available from CN80). **ENCDFON** and **ENCDBOR** allows you to *encode* ASCII files of your own creation, or *back* into font and border files to make them usable by ***POSTMASTER***. **ADDFON** and **ADDBOR** allow you to combine font and border files into libraries for use by ***POSTMASTER***. Other utilities included, along with sample files. **$39 + S&H.**

POSTMASTER 24:

for Model 4/4p/4d with a hi-res board and with *POSTMASTER*. This filtering program allows you to print your ***POSTMASTER*** printouts on a 24-pin Epson-compatible printer (such as CN80's Seikosha SL-90) with super sharp ***laser quality***. Works transparently to the rest of the system, loading right along with ***POSTMASTER***, and even removing itself when you are done with ***PM***. This is a utility that has to been seen to be believed! **$15+ S&H.**

FAST System Utilities

By **David Goben**, & *only* from *Computer News 80*

Fbackup: The ***fastest*** file-by-file backup utility ever written for the Model III or Model 4/4p/4d. Designed for LDOS 5.3, TRSDOS 6.2, or LS-DOS 6.3 It's a whopping **8 TIMES FASTER** than the BACKUP/CMD program supplied with these Disk Operating Systems. Plus it has many new features: *alphabetized backups, single drive file-by-file backups*, and *more*. It will even tell you how many disks you will need. This program has to be seen to be believed. Specify Model III LDOS 5.3 or Model 4 TRSDOS 6.2/LS-DOS 6.3 on order. $15 + S&H.

Fastback: The ***fastest*** hard disk backup utility ever written for the Model III or Model 4/4p/4d. No other hard disk backup or archiving utility is faster. **NONE!** Don't be fool by another's claims. Selecitvely backup or restore files, alphabetize, even see how many disks a backup will require. As easy as **FBACKUP**, but made for those large files that normal backup disks would not be able to hold. Designed for LDOS 5.3, TRSDOS 6.2, and LS-DOS 6.3. Specify Model III or Model 4 on order. $29.95 + S&H.

Fformat: This is the ***fastest*** disk formatting program ever written. Formats a 180K disk in 18 seconds! Works like FORMAT, but with greater versatility and speed. It can even apply high level formats and verify hard disks in one step -- no more fumbling with more than one utility. A PURGE parameter allows you to reformat disks in a flash. Format 80-cylinder 2-sided disk with ease with the BIG parameter. Designed exclusively for LDOS 5.3, TRSDOS 6.2, and LS-DOS 6.3. Specify Model III or Model 4 on order. $15 + S&H.

Word Processing

by **David Goben**, & *only* from *Computer News 80*

Script: Word processor for the Model III and 4/4p/4d. ***Not*** a patch program. This is a *complete* word processor with all the features made famous by SCRIPSIT, *plus* dozens of new amenities. Powerful editing, formatting, and printing features you would expect only from packages costing much, much more. A poor person's word processor that produces professional results. Specify computer and DOS when ordering. $37.95 + S&H.

Script Spelling Verifier: For Model III and 4/4p/4d. A *powerful* spelling checker/corrector for **SCRIPT**, Disk SCRIPSIT, ALLWRITE, ASCII, TED, and other ASCII format files. Features over 75,000 words. Add up to 17,000 more words to an additional custom dictionary. Specify computer and DOS when ordering. $37.95 + S&H.

SuperScripsit Spelling Checker: For Model III and Model 4/4p/4d. Add spell checking / proofreading capabilities to SuperSCRIPSIT. Fully integrates into the word processor. *Easy* to install. Specify computer when ordering. $37.95 + S&H.

Model 4 Spreadsheets

Written by **David Goben**

Available *only* from *Computer News 80*

BCX: *The Business Calculator for Extended Memory Model 4's.*

The spreadsheet for the 90's. For Model 4 128K+. Called by its users the *friendliest* and *fastest* spreadsheet ever written for the Model 4. **No** Model 4 spreadsheet calculates faster than **BCX**. It is so fast that users have become used to keeping the automatic update feature on at all times; something you would *never* want to do with VisiCalc or Multiplan. **BCX** can calculate sales projections, income taxes, personal budgets, cost estimates, engineering changes, balance your checkbook, plus ***thousands*** of other applications. Whatever you need tabulated or computed, **BCX** can do! Play "what if" with your spreadsheets to figure your best strategies; **BCX** will remember your calculations so that when you make changes that will affect other cells, the entire spreadsheet can be *quickly* and *automatically* updated to reflect those changes, no matter how many or how drastic.

Among its numerous features are:

- **Support of up to *1 megabyte* of memory**
- **A huge 64 x 256 cell matrix (16,384) to accommodate any needs**
- **Powerful, complete set of trigonometry functions for engineers**
- **Powerful automatic table look-ups**
- **Range math that transcend simple column or row limits**
- **Read and use VisiCalc sheets with little or no change**
- **Read and use Busy-Calc sheets without changes**
- **On-line, detailed quick reference windows to jog your memory**
- **Pop-up command windows in *plain* English; no trick keywords**
- **Fastest screen scrolling of any spreadsheet**
- **Powerful printer options to set up any printer**
- **Huge hand-holding hands-on tutorial to help you master BCX**
- **Many powerful replication and data manipulation features**
- **A handy quick reference and a complete reference manual**

and *many more* capabilities. Has all the features users wished VisiCalc and Multiplan had. With all this power, why settle for anything less?

BCX: *The way spreadsheets should be.* $109 + S&H

Demo disk available for $15. Good toward purchase of full program.

Busy-Calc: *The Family & Small Business Spreadsheet.*

For Model 4 64K+. An economical, yet powerful and *extremely fast* spreadsheet for those who do not need huge layouts. A comfortable 64 x 64 cell matrix with powerful function, math, and reference support. Can support up to 4 banks of extended memory if you have it, though not necessary. Has most of the features of **BCX**, though simpler in structure and thus easier to use.

Busy-Calc comes complete with a reference manual featuring an extensive hand-holding, hands-on tutorial. A quick reference manual is included when you just need a refresher.

Busy-Calc: *Making spreadsheets easy.* $79.95 + S&H

Demo disk available for $10. Good toward purchase of full program.

Still More Programs by David Goben

Available *only* from *Computer News 80*

Model 4 Small C:

For Model 4. Program in the language of the 90's without having to memorize huge volumes of complicated manuals. Small C is a large, almost complete subset of the C programming Laguage, and ***much*** more powerful than any other Small C package previously released for CP/M or MS-DOS. C is quickly becoming the programming language of choice by beginner and vetran programmers alike. See what it's all about without it costing you and arm and a leg. The package comes complete with the Small C compiler, program optimizer, macro assembler, and linking loader, plus other programs. What's more, the ***complete*** source code for all these files (except for MAKE/CMD) is included in this package, including the ***libraries***. More than that, ***all*** these files are written in Small C! So see by real-world example practical Small C programming! Complete with 225 page reference. **$45 + S&H**

Disk Optimization Package:

For Model 4. Quickly defragment the files on your disks or hard disks, and optimizes their storage space. Super fast operations for quick results. During normal everyday operations, you delete, create, and expand or compress files. This causes files to be broken up into several different locations on a disk. This results in slower access to your files. The included ***DIRCHECK*** program will test your drive for errors, and fix most that you may have thought were fatal. The included ***TESTFRAG*** tests a drive to see if files exist that are fragmented. ***DISKOPT*** will defragment your files, and optionally compress the disk space, to prevent easy fragmentation of files yet to be added to the drive. Full and complete support for Model 4 SubDirectories (below) included! Uses extended memory if available for even faster operation. An essential utility especially for hard disk owners. **$29.95 + S&H.**

SubDirectory Utilities:

For Model 4. Totally eliminate the 256-file limit of a disk drive with this set of utilities. Create *additional* directories that are subordinate to a disk's normal directory, or create whole branched systems, placing only related files in each SubDirectory. This set of utilities ***DO NOT*** create large, cumbersome files on your disks. Each SubDirectory takes up only a ***very small*** amount of disk space. These SubDirectories instead share the main directory allocation map, making large support files totally unnecessary. Even create SubDirectory trees on a floppy disk! Especially handy for hard disk users who are too often plagued by running out of file "slots" in a drive ***long*** before they run out of drive space. An essential utility for those who must keep huge repositories of files, or those who would prefer to keep related programs/files in separate niches. The SubDirectory Utilities is your answer. **$19.95 + S&H**

SuperSPOOL:

For Model 4. Increase your productivity by decreasing the time you spend waiting for your printer to finish. Allows printing in the "background" while you go on with your other computing tasks. Unlike the Model 4 SPOOL utility, **SuperSPOOL** will take advantage of all your extended memory, even if you have non-standard add-ons that have patched the DOS to support 32K banked blocks. Can use up to 1 Megabyte if you have it. On a standard 128K Model 4, this gives you a 64K printer buffer. Also unlike the DOS's SPOOL utility, **SuperSPOOL** will not lock up your computer and lose its data if the PAUSE feature is on. Even further, **SuperSPOOL** can load into *low memory*, so that those programs that cannot run with high memory routines present will operate. Using **SuperSPOOL** is like buying an expensive printer buffer device, but does not take up valuable desktop space, and costs a whole lot less. Set your printer free with **SuperSPOOL**. **$15 + S&H**

TRANSFER FILES BETWEEN Model 4/4P/4D and MS/PC

MS UTILITIES BY DAVID P. MILLER

Transfer files quickly and easily between your Model 4/4P/4D and IBM-PC Clones.

Transfer files from MS-DOS formatted disks to TRS/LSDOS formatted disks, or from TRS/LSDOS to MS-DOS formats on your Model 4 or 4P/4D.

Read MS-DOS formatted disk directories or format MS-DOS disks with your Model 4/4P/4D. Add linefeeds or strip linefeeds as needed.

$30.00 Plus S&H

David P. Miller is the author of PostMaster

MS-DOS Disk operating system by MicroSoft

DAVE'S MOUSE MENU

By David P. Miller

Build a up to twenty six DOS command menu with the ability to repeat the DOS command by pressing a keyboard letter, pressing the arrow keys to "point and shoot" or use your mouse for "point and shoot" selection.

No longer do you have to memorize DOS commands and parameters that you use all the time. Simply type them in once and then select them from the menu.

Fully compatible with the use of a mouse, keyboard or arrow keys.

$ 15.00 Plus S&H

David P. Miller is the author of PostMaster

Refer to March 1993 CN80 (Vol. 6 No. 3) for more information about Dave's Mouse Menu.

HOWE SOFTWARE FOR MODEL I, III AND MODEL 4/4D/4P

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TYPITALL Word Processor $ 49.95

Word processor upwardly compatible with SCRIPSIT -- it reads your old SCRIPSIT files and uses the same formatting and cursor movement commands. Send any control/graphics character to the printer. Print formatted text on the screen, or send it to a disk file for later printing. Merge data from a file during printing. Assign any sequence of keystrokes to a single control key. Call up to 16 help screens at any time. Move cursor forward or backward by character, word, line, paragraph or page. Complete with easy to read manual.

TYPITALL Word Processor with Spelling Checker $ 79.95

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SYSTEM DIAGNOSTIC $ 69.95

Complete tests for every component of your TRS-80 Model 1, 3, or 4 (separate versions for each model). **ROM:**checksum test. **RAM:**three tests: **Video Display:** character, video RAM, signal. **Keyboard:** every key contact tested. **Line printer:** character tests. **Disk Drives:** disk controller, drive select, track seek, read sectors, formatting, read/write/verify data with or without erasing, disk drive timer, disk head cleaner. Single/double density, single sided or double sided drives from 1 to 99 tracks. **RS-232-C Interface:** connector fault, data transmission, framing, data loop, baud rate generator. - Specify version when ordering.

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The intelligent telecommunications program for TRS-80 Model 1, 3, 4 or 2/12 CP/M. Memory buffer for sending and receiving file. Automatic transmission and reception of data. Character translations, true **BREAK** key, and help screens.

HOWE SOFTWARE FOR TRS-80 AND MS-DOS SYSTEMS

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A complete checkbook program combined with budget comparisons, income and expense analysis, and projections. Computes current checking balance. Also handles non-check expenses, bank debits, and income. Monthly and year-to-date summaries, yearly projections based on data up to a known month.

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I D I M BULLETIN BOARD HOST SYSTEM by Leonard Lorden

IDIM (I did it my way) Bulletin Board Host System is a completely new software system written for the Model 4. It comes with a 22 page manual full of instructions on how to get started and three disks of programs for setting up your own bulletin board system, or upgrading your existing system. Many new operating features have been added to this bulletin board program by the author. For those who would like to review its features send $2 to cover the cost of mailing and we will send you a copy of the manual for your inspection.

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Symphony 90 Interface with built-in amplifier and volume control. Use with your stereo amplifier and speakers, Or use with your headphones or separate speakers from the built-in amplifier.

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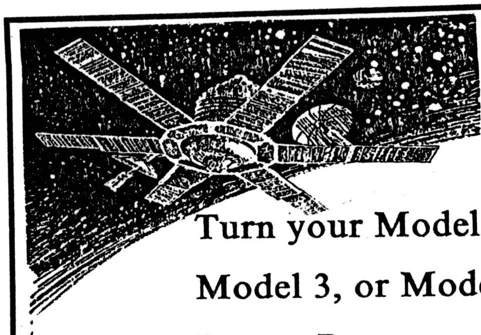

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Functions....................................	Add Delete Scan View Find (Search) Print Rename Change Update Toggle Locate Manual Backup Exit
Printouts......................................	Prints out three column 8-1/2 x 11 pages with your programs listed in alphabetical order or by extensions. Prints labels with Disk name, DOS type, and Type of disk, (system or data.)
System Requirements.................	Model I/III/4/4P/4D with one or more drives and 48K or more.

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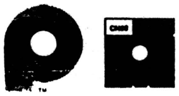

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ANYBODY have a MacInker for sale. How about Red Pencil or Blue Pencil from ILG, 80-Micro Magazines from 1980, any year 80-US magazine, or an EPROM programmer? Also interested in your TRS-80 computers. Copa International, RFD 1 Box 75A, Canal Street, Newark, IL 60541

FOR SALE: Model IV - upgraded to 128k, RS232 board installed. Disk drives recently refurb. $225 or B/O. Selling to get money for Laser Prt. Call: (804)795-7759 o/w Mickey Mepham, c/o 9602 John Tyler Memorial Hwy, Charles City, VA 23030

FOR SALE: GENUINE RADIO SHACK HARD DRIVES for Models 3 & 4. 5 Meg $175. 10 Meg $225. 15 Meg $275. 20 Meg $325. 35 Meg $455. Formatted under LS-DOS 6.X. New MISOSYS RSHARD5/6 driver included. Do it yourself special, (No Bubble) $125. Includes controller, P/S, fan, cables, driver. Install your own ST-506 bubble, half or full height. Instructions included. All cables included. Add S&H to all prices. All hardware used, tested, warranted 90 days. Call: Roy T. Beck 213-664-5059 after 6pm California Time, or Write: 2153 Cedarhurst Dr, Los Angeles, CA 90027

FOR SALE - Model 4, 26-1069, Good Cond. Some software including General Ledger & Payroll. $125 + shipping. J.R. Fender, 207 N. Keystone, Lee's Summit, MO 64086; (816)524-5309

FOR SALE: Model 3 w/Disk System Owners Manual; Model 4 software: General Ledger, AccPay, AccRec, Query, Inventory Control, Profile 4+, DeskMate, VisiCalc, M4/4P Tech Manual, 3 yrs of CN80, All for $300 or B/O. Mark Barefield, 3920 Princess Ln, Panama City, FL 32405; (904)763-9938 after 6pm.

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